



STIC Search Report

EIC 1700

STIC Database Tracking Number: 117568

TO: Raymond Alejandro
Location: REM 6B59
Art Unit : 1745
March 25, 2004

Case Serial Number: 10/018303

From: Barba Koroma
Location: EIC 1700
REM EO4 A30
Phone: 571 272 2546

barba.koroma@uspto.gov

Search Notes

Examiner Alejandro,
Please find attached results of the search you requested. Various components of the claimed invention as spelt out in the claims were searched in multiple databases.

For your convenience, titles of hits have been listed to help you peruse the results set quickly. This is followed by a detailed printout of records. Please let me know if you have any questions.
Thanks.

Access DB# 117568**SEARCH REQUEST FORM**

Scientific and Technical Information Center

Requester's Full Name: Raymond Alejandro Examiner #: 76895 Date: 03/17/04
Art Unit: 1745 Phone Number: 301/571/272-1282 Serial Number: 10/018303
Mail Box and Bldg/Room Location: Remsen 6B59 Results Format Preferred (circle): PAPER DISK E-MAIL

If more than one search is submitted, please prioritize searches in order of need.

Please provide a detailed statement of the search topic, and describe as specifically as possible the subject matter to be searched. Include the elected species or structures, keywords, synonyms, acronyms, and registry numbers, and combine with the concept or utility of the invention. Define any terms that may have a special meaning. Give examples or relevant citations, authors, etc, if known. Please attach a copy of the cover sheet, pertinent claims, and abstract.

Title of Invention: Polymer Electrolyte Fuel Cell & its usageInventors (please provide full names): Sakai et alEarliest Priority Filing Date: 10/30/01

**For Sequence Searches Only* Please include all pertinent information (parent, child, divisional, or issued patent numbers) along with the appropriate serial number.*

Please, search for subject matter of claims 1-4 & 6.

STAFF USE ONLY

| | Type of Search | Vendors and cost where applicable |
|------------------------------------|-----------------------|-----------------------------------|
| Searcher: _____ | NA Sequence (#) _____ | STN _____ |
| Searcher Phone #: _____ | AA Sequence (#) _____ | Dialog _____ |
| Searcher Location: _____ | Structure (#) _____ | Questel/Orbit _____ |
| Date Searcher Picked Up: _____ | Bibliographic _____ | Dr.Link _____ |
| Date Completed: _____ | Litigation _____ | Lexis/Nexis _____ |
| Searcher Prep & Review Time: _____ | Fulltext _____ | Sequence Systems _____ |
| Clerical Prep Time: _____ | Patent Family _____ | WWW/Internet _____ |
| Online Time: _____ | Other _____ | Other (specify) _____ |

=> file caplus

FILE 'CAPLUS' ENTERED AT 15:30:57 ON 25 MAR 2004

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FILE COVERS 1907 - 25 Mar 2004 VOL 140 ISS 13

FILE LAST UPDATED: 24 Mar 2004 (20040324/ED)

This file contains CAS Registry Numbers for easy and accurate substance identification.

=> file wpix

FILE 'WPIX' ENTERED AT 15:31:01 ON 25 MAR 2004

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FILE LAST UPDATED: 24 MAR 2004 <20040324/UP>

MOST RECENT DERWENT UPDATE: 200420 <200420/DW>

DERWENT WORLD PATENTS INDEX SUBSCRIBER FILE, COVERS 1963 TO DATE

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GUIDES, PLEASE VISIT:

<http://thomsonderwent.com/support/userguides/> <<<

>>> ADDITIONAL POLYMER INDEXING CODES WILL BE IMPLEMENTED FROM
DERWENT UPDATE 200403.

THE TIME RANGE CODE WILL ALSO CHANGE FROM 018 TO 2004.

SDIS USING THE TIME RANGE CODE WILL NEED TO BE UPDATED.

FOR FURTHER DETAILS: <http://thomsonderwent.com/chem/polymers/> <<<

=> file japio

FILE 'JAPIO' ENTERED AT 15:31:05 ON 25 MAR 2004
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FILE LAST UPDATED: 1 MAR 2004 <20040301/UP>
FILE COVERS APR 1973 TO OCTOBER 31, 2003

<<< GRAPHIC IMAGES AVAILABLE >>>

=> d que

| | | | | | | |
|-----|-------|-----|-------------|--------|--------|--|
| L1 | 12 | SEA | FILE=CAPLUS | ABB=ON | PLU=ON | POLYMER (5A) ELECTROLYTE (4A) CELL AND USAGE |
| L2 | 4270 | SEA | FILE=CAPLUS | ABB=ON | PLU=ON | POLYMER (5A) ELECTROLYTE (4A) CELL |
| L3 | 14910 | SEA | FILE=CAPLUS | ABB=ON | PLU=ON | POLYMER (5A) ELECTROLYTE |
| L4 | 14910 | SEA | FILE=CAPLUS | ABB=ON | PLU=ON | (L1 OR L2 OR L3) |
| L5 | 727 | SEA | FILE=CAPLUS | ABB=ON | PLU=ON | STACK? AND L4 |
| L6 | 4 | SEA | FILE=CAPLUS | ABB=ON | PLU=ON | RETAIN? (4A) PLATE AND L4 |
| L7 | 1839 | SEA | FILE=CAPLUS | ABB=ON | PLU=ON | SEPARATOR? (4A) PLATE? |
| L8 | 95 | SEA | FILE=CAPLUS | ABB=ON | PLU=ON | L7 AND L4 |
| L9 | 88 | SEA | FILE=CAPLUS | ABB=ON | PLU=ON | GAS (4A) SUPPLY AND L4 |
| L10 | 179 | SEA | FILE=CAPLUS | ABB=ON | PLU=ON | (L8 OR L9) |
| L11 | 72 | SEA | FILE=CAPLUS | ABB=ON | PLU=ON | (L10 OR L6) AND L5 |
| L14 | 15 | SEA | FILE=CAPLUS | ABB=ON | PLU=ON | COOL? (4A) WATER? AND (L10 OR L11) |
| L15 | 80 | SEA | FILE=CAPLUS | ABB=ON | PLU=ON | L11 OR L14 |
| L18 | 624 | SEA | FILE=CAPLUS | ABB=ON | PLU=ON | FLOW? (4A) CHANNEL? (4A) WATER? |
| L25 | 4 | SEA | FILE=CAPLUS | ABB=ON | PLU=ON | L18 AND L4 |
| L26 | 84 | SEA | FILE=CAPLUS | ABB=ON | PLU=ON | L25 OR L15 |
| L27 | 84 | SEA | FILE=CAPLUS | ABB=ON | PLU=ON | L26 AND POLYMER? |
| L31 | 10816 | SEA | FILE=CAPLUS | ABB=ON | PLU=ON | VOLTAGE (5A) (MEASUREMENT OR DISPLAY) |
| L38 | 13 | SEA | FILE=CAPLUS | ABB=ON | PLU=ON | L3 AND L31 |
| L39 | 97 | SEA | FILE=CAPLUS | ABB=ON | PLU=ON | L27 OR L38 |
| L40 | 6 | SEA | FILE=CAPLUS | ABB=ON | PLU=ON | L39 AND CONDUCT? (4A) SEPARATOR AND PLATES |
| L42 | 31 | SEA | FILE=CAPLUS | ABB=ON | PLU=ON | L39 AND GAS (3A) SUPPLY |
| L43 | 37 | SEA | FILE=CAPLUS | ABB=ON | PLU=ON | L40 OR L42 |
| L45 | 54 | SEA | FILE=WPIX | ABB=ON | PLU=ON | L40 OR L42 |
| L46 | 15 | SEA | FILE=WPIX | ABB=ON | PLU=ON | L45 AND POLYMER (4A) ELECTROLYTE (5A) MEMBRANE |
| L48 | 3 | SEA | FILE=JAPIO | ABB=ON | PLU=ON | L45 AND POLYMER (4A) ELECTROLYTE (5A) MEMBRANE |
| L49 | 53 | DUP | REM | L43 | L46 | L48 (2 DUPLICATES REMOVED) |

=> d ti 1-53

YOU HAVE REQUESTED DATA FROM FILE 'CAPLUS, WPIX, JAPIO' - CONTINUE? (Y)/N:y

L49 ANSWER 1 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN
TI Fuel cell system

- L49 ANSWER 2 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN
TI **Polymer electrolyte** fuel-cell system for shortened warming up
- L49 ANSWER 3 OF 53 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN
TI Fuel cell system, has transfer cell with polybenzimidazole ion exchange membrane coupled to **gas** stream, and power **supply** coupled to cell such that current separates hydrogen in cell from gas stream to pure hydrogen stream.
- L49 ANSWER 4 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 1
TI **Conductive separator plate** for **polymer electrolyte** fuel cell
- L49 ANSWER 5 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN
TI Apparatus for supplying hydrogen by using **polymer electrolyte**-type water electrolysis tank
- L49 ANSWER 6 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN
TI Apparatus for supplying hydrogen by using **polymer-electrolyte**-type water electrolysis tank and its starting method
- L49 ANSWER 7 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN
TI Solid **polymer electrolyte**-type fuel cell system having moisture controller for air provided to oxidizing gas
- L49 ANSWER 8 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN
TI Fuel cell system and its control method
- L49 ANSWER 9 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN
TI Solid **polymer electrolyte** fuel cell power plant and its operation
- L49 ANSWER 10 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN
TI Improvements in sealing structure of **polymer electrolyte** fuel cell
- L49 ANSWER 11 OF 53 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN
TI Electrode for **polymer electrolyte** fuel cell e.g. for electric vehicle or motorized wheelchair, has solid **polymer electrolyte membrane**, electrode layers and reinforcing members integrally formed by sealing member.
- L49 ANSWER 12 OF 53 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN
TI Fuel cell **stack**, has cell units arranged symmetrically, membrane electrode assembly interposed between anode and cathode and port to **supply** reactant **gases** to cell unit.
- L49 ANSWER 13 OF 53 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN
TI **Polymer electrolyte** fuel cell used as portable power source includes electrolyte membrane - electrode assembly

with pair of electrodes provided with predetermined tightening pressure.

L49 ANSWER 14 OF 53 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN

TI **Polymer electrolyte** fuel cell, for portable power source, electric vehicle and co generation system, includes pair of end plates made of electrically insulating resin-dominant material.

L49 ANSWER 15 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN

TI Design, fabrication, and assembly of a **polymer electrolyte** membrane fuel cell (PEMFC)

L49 ANSWER 16 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN

TI **Polymer electrolyte** fuel cell and cooling system thereof

L49 ANSWER 17 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN

TI High-**polymer electrolyte** fuel cell

L49 ANSWER 18 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN

TI Method of supplying reaction gas in fuel cell of solid **polymer electrolyte** fuel cell assembly

L49 ANSWER 19 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN

TI **Polymer electrolyte** type fuel cell

L49 ANSWER 20 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN

TI Proton electrolyte membrane fuel cell with antifreeze coolant and humidifiers

L49 ANSWER 21 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN

TI Modular **polymer electrolyte** membrane unit fuel cell assembly and fuel cell stack

L49 ANSWER 22 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN

TI Method for operation of **polymer-electrolyte** fuel cell power plant

L49 ANSWER 23 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN

TI Fuel cell system

L49 ANSWER 24 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN

TI **Polymer electrolyte** fuel cell power plant and its operation method

L49 ANSWER 25 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN

TI **Polymer-electrolyte** fuel cell combined with thermoelectric transducer and fuel cell stack

L49 ANSWER 26 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN

TI **Polymer-electrolyte** fuel cell

L49 ANSWER 27 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN

- TI Method of supplying reaction gas in solid **polymer electrolyte fuel cell** assembly
- L49 ANSWER 28 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN
- TI Impregnated carbon fiber fabrics for gas diffusion electrode of **polymer electrolyte** membrane fuel **cell stacks**
- L49 ANSWER 29 OF 53 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN
- TI Supplying of hydrogen gas stream to fuel cell anode, involves introducing feed gas stream to adsorption module having chemically distinct adsorbents which adsorb contaminant to produce pure hydrogen gas stream.
- L49 ANSWER 30 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 2
- TI Method of controlling **polymer electrolyte fuel cell** system
- L49 ANSWER 31 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN
- TI Fuel cell power plants and their operation method
- L49 ANSWER 32 OF 53 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN
- TI High temperature membrane (HTM) fuel-cell installation - uses preheating device for preheating oxidant and for pre-heating at least one process gas independently of HTM fuel-cell unit operation.
- L49 ANSWER 33 OF 53 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN
- TI Solid high molecular form fuel cell, has reactive **gas supply** stream, humidifier, inert **gas supply** unit, controller and separator of unit battery circulating gas before generating electricity by controller.
- L49 ANSWER 34 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN
- TI **Polymer electrolyte** fuel **cells** and their operation method
- L49 ANSWER 35 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN
- TI Fuel cell **stack** with separator of a laminate structure
- L49 ANSWER 36 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN
- TI Solid **polymer electrolyte** fuel **cells**
- L49 ANSWER 37 OF 53 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN
- TI Fuel cell system includes a fuel cell **stack** comprising fuel cells having membrane-electrode assemblies that are hydrated with liquid water, and bipolar plates for distributing hydrogen fuel gas and water.
- L49 ANSWER 38 OF 53 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN
- TI **Polymer electrolyte** fuel **cell** for portable power sources, electric vehicle power sources and domestic co-generation systems has reliable unit cell **stack** fastening mechanism.
- L49 ANSWER 39 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN

TI **Polymer electrolyte fuel cell stacks**

L49 ANSWER 40 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN

TI Solid **polymer electrolyte** fuel cell power plants

L49 ANSWER 41 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN

TI PEM fuel cell system with dampening and/or cooling with liquid medium, their use as well as a method for dampening and cooling of such system

L49 ANSWER 42 OF 53 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN

TI Fuel supply arrangement in solid **polymer electrolyte** type fuel battery - includes gas flow path equipped with water inlet through which water is supplied among fuel gas and oxidising agent gas flow paths.

L49 ANSWER 43 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN

TI Solid **polymer electrolyte** fuel cell power plants

L49 ANSWER 44 OF 53 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN

TI **Polymer electrolyte membrane** fuel cell stack. - Uses stack of fuel cells with membrane electrode assembly with gas distributor supplying gas to anode layer..

L49 ANSWER 45 OF 53 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN

TI Fuel cell battery flow distribution evaluation method - detecting voltage characteristic across each cell during supply of anode and cathode spaces with gas flow having varying hydrogen partial pressure.

L49 ANSWER 46 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN

TI Method for operation condition monitoring and operation control for **polymer electrolyte fuel cell stacks**

L49 ANSWER 47 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN

TI Solid **polymer electrolyte** fuel cells

L49 ANSWER 48 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN

TI **Stacked** fuel cell with solid **polymer electrolyte**

L49 ANSWER 49 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN

TI Solid **polymer electrolyte** fuel cell **stacks** with built-in cathode gas humidifying means

L49 ANSWER 50 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN

TI Solid **polymeric** electrolyte fuel-cell power plants and their operation

L49 ANSWER 51 OF 53 JAPIO (C) 2004 JPO on STN

TI PEM FUEL CELL **STACK** AND ITS MANUFACTURING METHOD

L49 ANSWER 52 OF 53 JAPIO (C) 2004 JPO on STN
TI **POLYMER-ELECTROLYTE FUEL CELL STACK**
AND ELECTRIC VEHICLE WITH THIS FUEL CELL **STACK**

L49 ANSWER 53 OF 53 JAPIO (C) 2004 JPO on STN
TI FUEL CELL SYSTEM

=> d all 1-53 149

YOU HAVE REQUESTED DATA FROM FILE 'CAPLUS, WPIX, JAPIO' - CONTINUE? (Y)/N:y

L49 ANSWER 1 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN
AN 2004:204128 CAPLUS
DN 140:202499
ED Entered STN: 14 Mar 2004
TI Fuel cell system
IN Morita, Koji
PA Nissan Motor Co., Ltd., Japan
SO PCT Int. Appl., 38 pp.
CODEN: PIXXD2
DT Patent
LA English
IC ICM H01M008-04
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|----|---|------|----------|-----------------|----------|
| | ----- | ---- | ----- | ----- | ----- |
| PI | WO 2004021494 | A2 | 20040311 | WO 2003-JP10833 | 20030827 |
| | W: JP, US | | | | |
| | RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, | | | | |
| | IT, LU, MC, NL, PT, RO, SE, SI, SK, TR | | | | |

PRAI JP 2002-252738 A 20020830

AB A fuel cell assembly has a fuel **cell stack** provided with a **polymer electrolyte** membrane, an air electrode and a fuel electrode; an air supply device for supplying air; a fuel **gas supply** device for supplying fuel **gas**, and a humidity regulation module allowing movement of water from a humid air passage to a dry air passage. The air electrode is divided into an upstream air electrode and a downstream air electrode. The air supplied from the air supply device is supplied to the upstream air electrode after passing through the dry air passage. The air discharged from the upstream air electrode is supplied to the downstream air electrode after passing through the humid air passage.

ST fuel cell system cathode water management

IT Fuel cell cathodes

Fuel cells

(water management in cathode of fuel cell system)

L49 ANSWER 2 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN

AN 2004:77109 CAPLUS
 DN 140:114264
 ED Entered STN: 30 Jan 2004
 TI **Polymer electrolyte fuel-cell** system for
 shortened warming up
 IN Horiguchi, Munehisa; Shiraishi, Koichi
 PA Equos Research Co., Ltd., Japan
 SO Jpn. Kokai Tokkyo Koho, 13 pp.
 CODEN: JKXXAF
 DT Patent
 LA Japanese
 IC ICM H01M008-04
 ICS H01M008-06; H01M008-10
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|----------------|------|----------|-----------------|----------|
| PI | JP 2004031176 | A2 | 20040129 | JP 2002-186937 | 20020626 |
| PRAI | JP 2002-186937 | | 20020626 | | |

AB The claimed system is equipped with (1) a means for retaining a fuel gas under contact with an anode in a fuel cell **stack**, (2) a means for introducing a fuel gas to (1), (3) a means for discharging the fuel gas from (1), (4) a means for detecting temperature of the fuel cell, and (5) a means for retaining the fuel gas in (1) while the detected temperature is lower than predetd. temperature The system provides high heat efficiency by suppressing heat discharge from the **stack**.

ST **polymer electrolyte fuel cell** system warming up

IT Fuel cells
 (power plants; fuel-cell system with controlled fuel **gas supply** for shortened warming up)

IT 1333-74-0, Hydrogen, uses
 RL: TEM (Technical or engineered material use); USES (Uses)
 (fuel-cell system with controlled fuel **gas supply** for shortened warming up)

L49 ANSWER 3 OF 53 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN

AN 2004-179654 [17] WPIX

DNN N2004-142932

TI Fuel cell system, has transfer cell with polybenzimidazole ion exchange membrane coupled to **gas** stream, and power **supply** coupled to cell such that current separates hydrogen in cell from gas stream to pure hydrogen stream.

DC X16

IN BALLANTINE, A W; CHARTRAND, R L

PA (PLUG-N) PLUG POWER INC

CYC 1

PI US 2004028979 A1 20040212 (200417)* 19p H01M008-04

ADT US 2004028979 A1 US 2002-214019 20020807

PRAI US 2002-214019 20020807

IC ICM H01M008-04

ICS H01M008-10

AB US2004028979 A UPAB: 20040310

NOVELTY - The system has a transfer cell (94) coupled to a gas stream, where the cell includes a polybenzimidazole ion exchange membrane. A power supply is coupled to the cell such that the current from the supply separates hydrogen in the cell from gas stream to a pure hydrogen stream.

A polymer electrolyte membrane fuel

cell is coupled to the cell to react with a portion of pure hydrogen.

USE - Used for converting chemical energy into electrical energy that is fed to load supplying electricity to residential appliance.

ADVANTAGE - The transfer cell uses polybenzimidazole ion exchange membrane, thereby avoiding the poisoning of the cell with the carbon monoxide from the gas stream.

DESCRIPTION OF DRAWING(S) - The drawing shows a fuel cell system with an electrochemical transfer cell.

Transfer cell 94

Fuel cell **stack** 96

Vent 110

Switch 116

Electrical connector 118

Dwg.4/8

FS EPI

FA AB; GI

MC EPI: X16-C01C; X16-C09

L49 ANSWER 4 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 1

AN 2003:203523 CAPLUS

DN 138:207861

ED Entered STN: 14 Mar 2003

TI **Conductive separator plate for
polymer electrolyte fuel cell**

IN Kusakabe, Hiroki; Hatoh, Kazuhito; Ohara, Hideo; Hase, Nobuhiro;
Kobayashi, Susumu; Yamazaki, Tatsuto; Takeguchi, Shinsuke

PA Matsushita Electric Industrial Co., Ltd., Japan

SO Eur. Pat. Appl., 14 pp.

CODEN: EPXXDW

DT Patent

LA English

IC ICM H01M008-02

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 38

FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|--|------|----------|-----------------|----------|
| PI | EP 1291946 | A2 | 20030312 | EP 2002-256219 | 20020909 |
| | R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, SK | | | | |
| | JP 2003163015 | A2 | 20030606 | JP 2002-264353 | 20020910 |
| | CN 1405906 | A | 20030326 | CN 2002-131539 | 20020911 |
| | US 2003072986 | A1 | 20030417 | US 2002-238904 | 20020911 |
| PRAI | JP 2001-274602 | A | 20010911 | | |

AB A **polymer electrolyte fuel cell** comprises a

cell stack comprising a plurality of membrane electrode assemblies and a plurality of **conductive separator plates** that are **stacked** alternately, each of the membrane electrode assemblies comprising a hydrogen-ion conductive **polymer electrolyte** membrane, and an anode and a cathode sandwiching the **polymer electrolyte** membrane. The **conductive separator plate** is formed of a molded plate comprising a carbon powder and a binder, the **conductive separator plate** having a main portion which is raised from a peripheral portion surrounding the main portion, the main portion being in contact with the anode or the cathode and being provided with a gas flow path for supplying a fuel gas to the anode or a gas flow path for supplying an oxidant gas to the cathode.

- ST **polymer electrolyte fuel cell**
conductive separator plate
- IT Electric vehicles
Fuel cell electrolytes
Fuel cell separators
Polymer electrolytes
Solid state fuel cells
(conductive separator plate for
polymer electrolyte fuel cell)
- IT Carbon black, uses
Carbon fibers, uses
Fluoro rubber
RL: DEV (Device component use); USES (Uses)
(conductive separator plate for
polymer electrolyte fuel cell)
- IT Polyoxyalkylenes, uses
RL: DEV (Device component use); USES (Uses)
(fluorine- and sulfo-containing, ionomers; **conductive separator plate for polymer electrolyte fuel cell**)
- IT Fluoropolymers, uses
RL: DEV (Device component use); USES (Uses)
(polyoxyalkylene-, sulfo-containing, ionomers; **conductive separator plate for polymer electrolyte fuel cell**)
- IT Ionomers
RL: DEV (Device component use); USES (Uses)
(polyoxyalkylenes, fluorine- and sulfo-containing; **conductive separator plate for polymer electrolyte fuel cell**)
- IT Fuel cells
(power plants; **conductive separator plate for polymer electrolyte fuel cell**)
- IT 7440-06-4, Platinum, uses 7440-18-8, Ruthenium, uses
RL: CAT (Catalyst use); USES (Uses)
(conductive separator plate for
polymer electrolyte fuel cell)
- IT 7440-44-0, Carbon, uses 163294-14-2, Nafion 112
RL: DEV (Device component use); USES (Uses)

(conductive separator plate for
polymer electrolyte fuel cell)

L49 ANSWER 5 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN
 AN 2003:945661 CAPLUS
 DN 140:7129
 ED Entered STN: 04 Dec 2003
 TI Apparatus for supplying hydrogen by using **polymer electrolyte**-type water electrolysis tank
 IN Takama, Toshihide
 PA Hitachi Shipbuilding and Engineering Co., Ltd., Japan
 SO Jpn. Kokai Tokkyo Koho, 7 pp.
 CODEN: JKXXAF
 DT Patent
 LA Japanese
 IC ICM C25B001-10
 ICS C02F001-42; C02F001-44; C02F001-46; C25B001-12; C25B009-00;
 H01M008-00
 CC 52-1 (Electrochemical, Radiational, and Thermal Energy Technology)
 Section cross-reference(s): 49, 72

FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|----------------|------|----------|-----------------|----------|
| PI | JP 2003342769 | A2 | 20031203 | JP 2002-156612 | 20020530 |
| PRAI | JP 2002-156612 | | 20020530 | | |

AB The title apparatus is equipped with a pressure container for storing a water electrolysis tank by filling a gap with **water**, a **cooling water**-circulating line for returning water after treating the filled water, and a pressure-difference control line to give predetd. pressure difference between inside of the electrolysis tank and the pressure container. The apparatus, especially suitable for fuel-cell H station for

35-70 MPa high-pressure H **gas supply**, is prevented from damage of the **polymer electrolyte** membrane.

ST hydrogen fuel supply app **polymer electrolyte** water electrolysis pressure

IT Electrolysis

Fuel gas manufacturing

(apparatus for supplying hydrogen by using **polymer electrolyte**-type water electrolysis tank stored in pressure container)

IT 1333-74-0P, Hydrogen, uses

RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(apparatus for supplying hydrogen by using **polymer electrolyte**-type water electrolysis tank stored in pressure container)

IT 7782-44-7P, Oxygen, preparation

RL: PNU (Preparation, unclassified); PREP (Preparation)

(apparatus for supplying hydrogen by using **polymer electrolyte**-type water electrolysis tank stored in pressure container)

IT 7732-18-5, Water, reactions
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (apparatus for supplying hydrogen by using **polymer electrolyte**-type water electrolysis tank stored in pressure container)

L49 ANSWER 6 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN
 AN 2003:943526 CAPLUS
 DN 140:7126
 ED Entered STN: 04 Dec 2003
 TI Apparatus for supplying hydrogen by using **polymer-electrolyte**-type water electrolysis tank and its starting method
 IN Oshiro, Hitoshi; Kondo, Masayoshi; Tatsumi, Hiroshi
 PA Hitachi Shipbuilding and Engineering Co., Ltd., Japan
 SO Jpn. Kokai Tokkyo Koho, 8 pp.
 CODEN: JKXXAF
 DT Patent
 LA Japanese
 IC ICM C25B001-10
 ICS C25B001-12; C25B009-00; H01M008-04
 CC 52-1 (Electrochemical, Radiational, and Thermal Energy Technology)
 Section cross-reference(s): 49, 72

FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|----------------|------|----------|-----------------|----------|
| PI | JP 2003342768 | A2 | 20031203 | JP 2002-156611 | 20020530 |
| PRAI | JP 2002-156611 | | 20020530 | | |

AB The title apparatus is equipped with an electrolytic cell, a H gas/liquid separation chamber, an O gas/liquid separation chamber, and a water circulation line, where

the electrolytic cell has a coolant inlet for heat removal. The apparatus may be equipped with a pressure container for storing the electrolytic cell by filling a gap with water and a pressure-control pipe connecting the gap with the O gas/liquid separation chamber, where the claimed process comprises opening a pressure control valve in the pipe while starting up the apparatus and then closing the valve when the pressure container shows predetd. pressure. The apparatus, especially suitable for fuel-cell H station for

35-70 MPa

high-pressure H gas supply, is prevented from damage of the **polymer electrolyte** membrane.

ST hydrogen fuel supply app **polymer electrolyte water** electrolysis **cooling**

IT Cooling
 Electrolysis

Fuel gas manufacturing

(apparatus containing cooling system for supplying hydrogen by using **polymer-electrolyte**-type water electrolysis tank)

IT 7782-44-7P, Oxygen, preparation

RL: PNU (Preparation, unclassified); PREP (Preparation)

(apparatus containing cooling system for supplying hydrogen by using **polymer-electrolyte**-type water electrolysis tank)

IT 1333-74-0P, Hydrogen, uses
 RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
 (coolant; apparatus containing cooling system for supplying hydrogen by using

polymer-electrolyte-type water electrolysis tank)

IT 7732-18-5, **Water**, uses
 RL: NUU (Other use, unclassified); RCT (Reactant); RACT (Reactant or reagent); USES (Uses)
 (coolant; apparatus containing **cooling** system for supplying hydrogen by using **polymer-electrolyte-type water electrolysis tank)**

L49 ANSWER 7 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN

AN 2003:607901 CAPLUS

DN 139:136105

ED Entered STN: 08 Aug 2003

TI Solid **polymer electrolyte-type fuel cell**

system having moisture controller for air provided to oxidizing gas

IN Fujii, Yosuke; Okamoto, Hideo; Murakami, Yoshikazu

PA Honda Motor Co., Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 10 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM H01M008-04

ICS H01M008-10; H01M008-00

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|----------------|------|----------|-----------------|----------|
| PI | JP 2003223909 | A2 | 20030808 | JP 2002-333520 | 20021118 |
| PRAI | JP 2001-358070 | A | 20011122 | | |

AB The title fuel cell comprises a **stack** of unit cells, each of which is made up of a solid **polymer electrolyte** film having an anode and a cathode, a coolant **supply**, a fuel **gas supply**, an oxidizing **gas supply**, and a water recovery and circulation from the oxidizing offgas, wherein a moisture content in the oxidizing offgas is controlled by regulating an amount of the coolant, thereby controlling an amount of moisture supplied to the oxidizing gas.

ST solid **polymer electrolyte fuel cell** moisture control

IT Fuel **cells**

Water vapor

(solid **polymer electrolyte-type fuel cell**

system having moisture controller for air provided to oxidizing gas)

L49 ANSWER 8 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN

AN 2003:94666 CAPLUS

DN 138:156255

ED Entered STN: 07 Feb 2003

TI Fuel cell system and its control method
 IN Horiguchi, Munehisa
 PA Equos Research Co., Ltd., Japan
 SO Jpn. Kokai Tokkyo Koho, 7 pp.
 CODEN: JKXXAF
 DT Patent
 LA Japanese
 IC ICM H01M008-04
 ICS H01M008-04; B60L011-18; H01M008-10
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|----------------|------|----------|-----------------|----------|
| PI | JP 2003036870 | A2 | 20030207 | JP 2001-224080 | 20010725 |
| PRAI | JP 2001-224080 | | 20010725 | | |

AB The system has a H/O fuel **cell stack**, containing a solid **polymer electrolyte** layer between a cathode supplied with air by an air passage and an anode supplied with H by an H gas passage; a H-storage means connected to the **stack** via the H **gas supply** passage; a H **supply** pipe supplying the H **gas** to the H **gas** passage; and a H **supply** means, containing a H filling pipe connected to an H filling inlet for introducing H from outside and H-storage means; where the H supply means has a means removing foreign matters from the H filling inlet. The system is controlled by the removal means for removing the foreign matters from the H filling inlet while the inlet is connected to an external H filling source.

ST fuel cell system structure control method hydrogen supply means; foreign matter removal hydrogen supply means fuel cell system

IT Fuel cells
 (structure and control method of fuel cell systems containing containing H supply means with foreign matter removal means)

IT 1333-74-0, Hydrogen, uses
 RL: DEV (Device component use); USES (Uses)
 (structure and control method of fuel cell systems containing containing H supply means with foreign matter removal means)

L49 ANSWER 9 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN
 AN 2003:75504 CAPLUS
 DN 138:140049
 ED Entered STN: 31 Jan 2003
 TI Solid **polymer electrolyte** fuel **cell** power plant and its operation
 IN Aoki, Makoto
 PA Fuji Electric Co., Ltd., Japan
 SO Jpn. Kokai Tokkyo Koho, 6 pp.
 CODEN: JKXXAF
 DT Patent
 LA Japanese
 IC ICM H01M008-04
 ICS H01M008-04; H01M008-10
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|--|------|----------|-----------------|----------|
| PI | JP 2003031254 | A2 | 20030131 | JP 2001-214857 | 20010716 |
| PRAI | JP 2001-214857 | | 20010716 | | |
| AB | The power plant has a fuel cell stack , containing a solid polymer electrolyte held between a pair of electrodes, having a catalyst layer contacting the electrolyte, an air as oxidant gas supplied to the cathode, and a H fuel gas supplied to the anode; where ≥ 1 reaction gas is passed through an internal humidifier, and then supplied to the electrode. The power plant is operated by discharging the ≥ 1 reaction gas via the humidifier to outside the fuel cell within a predetd. time after stopping the reaction gas supply to the cell, and passing through an inert gas or an unhumidified reaction gas at a predetd. time owing to the decrease of moisture inside the cell. | | | | |
| ST | fuel cell power plant structure reaction gas humidifier | | | | |
| IT | Fuel cells (power plants; structure and operation method of fuel cell power plants containing reaction gas humidifiers) | | | | |
| IT | Humidity (structure and operation method of fuel cell power plants containing reaction gas humidifiers) | | | | |

L49 ANSWER 10 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN
 AN 2003:298773 CAPLUS
 DN 138:306816
 ED Entered STN: 18 Apr 2003
 TI Improvements in sealing structure of **polymer electrolyte**
fuel cell
 IN Kobayashi, Susumu; Hosaka, Masato; Hatoh, Kazuhito; Murakami, Hikaru;
 Takezawa, Mikio; Onishi, Takayuki
 PA Matsushita Electric Industrial Co., Ltd., Japan
 SO Eur. Pat. Appl., 29 pp.
 CODEN: EPXXDW
 DT Patent
 LA English
 IC ICM H01M008-10
 ICS H01M008-24; H01M008-02
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 Section cross-reference(s): 38

FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|--|------|----------|-----------------|----------|
| PI | EP 1302996 | A2 | 20030416 | EP 2002-257108 | 20021014 |
| | R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, SK | | | | |
| | US 2003087142 | A1 | 20030508 | US 2002-270238 | 20021015 |
| | CN 1412875 | A | 20030423 | CN 2002-147317 | 20021016 |
| | JP 2003197224 | A2 | 20030711 | JP 2002-301780 | 20021016 |
| PRAI | JP 2001-318666 | A | 20011016 | | |
| AB | The present invention provides a polymer electrolyte fuel cell in which neither cross leakage nor outward leakage | | | | |

occurs with the application of low clamping pressures. The **polymer electrolyte fuel cell** comprises a unit cell, the unit cell comprising: a membrane electrode assembly (MEA) comprising a **polymer electrolyte** membrane, a gasket covering the periphery of the electrolyte membrane, an anode and a cathode attached to the electrolyte membrane; and **conductive separator plates** sandwiching the MEA there-between. The gasket and the **separator plates** have a pair of manifold apertures for each of fuel gas, oxidant gas and **cooling water**. The gasket comprises dummy ribs surrounding each of the manifold apertures, and the **separator plates** have grooves into which each of the dummy ribs is fitted loosely such that there is a clearance there-between. The gasket further has seal ribs surrounding each of the manifold apertures, the anode and the cathode, as well as seal ribs formed on both sides of each of gas passages connecting the fuel gas manifold apertures with the anode and gas passages connecting the oxidant gas manifold apertures with the cathode. These seal ribs, except for in the gas passages, are pressed against the **separator plates** by clamping pressure of the cell **stack** to form gas sealing sections.

- ST sealing structure improvement **polymer electrolyte fuel cell**
- IT Polyoxyalkylenes, uses
 RL: DEV (Device component use); USES (Uses)
 (fluorine- and sulfo-containing, ionomers; improvements in sealing structure of **polymer electrolyte fuel cell**)
- IT Gaskets
 Seals (parts)
 Solid state fuel cells
 (improvements in sealing structure of **polymer electrolyte fuel cell**)
- IT Carbon black, uses
 RL: CAT (Catalyst use); TEM (Technical or engineered material use); USES (Uses)
 (improvements in sealing structure of **polymer electrolyte fuel cell**)
- IT Fluoropolymers, uses
 RL: MOA (Modifier or additive use); USES (Uses)
 (improvements in sealing structure of **polymer electrolyte fuel cell**)
- IT Carbon fibers, uses
 RL: TEM (Technical or engineered material use); USES (Uses)
 (improvements in sealing structure of **polymer electrolyte fuel cell**)
- IT Thermoplastic rubber
 RL: DEV (Device component use); USES (Uses)
 (polyester; improvements in sealing structure of **polymer electrolyte fuel cell**)
- IT Fluoropolymers, uses
 RL: DEV (Device component use); USES (Uses)
 (polyoxyalkylene-, sulfo-containing, ionomers; improvements in sealing

structure of **polymer electrolyte fuel cell**
)

IT Ionomers
 RL: DEV (Device component use); USES (Uses)
 (polyoxyalkylenes, fluorine- and sulfo-containing; improvements in sealing
 structure of **polymer electrolyte fuel cell**
)

IT Polyester rubber
 RL: TEM (Technical or engineered material use); USES (Uses)
 (thermoplastic, Hytrel M 7240, gasket material; improvements in sealing
 structure of **polymer electrolyte fuel cell**
)

IT Polyester rubber
 RL: DEV (Device component use); USES (Uses)
 (thermoplastic; improvements in sealing structure of **polymer
 electrolyte fuel cell**)

IT 7440-06-4, Platinum, uses
 RL: CAT (Catalyst use); USES (Uses)
 (improvements in sealing structure of **polymer
 electrolyte fuel cell**)

IT 66796-30-3, Nafion 117
 RL: DEV (Device component use); USES (Uses)
 (improvements in sealing structure of **polymer
 electrolyte fuel cell**)

IT 9002-84-0, Ptfе
 RL: MOA (Modifier or additive use); USES (Uses)
 (improvements in sealing structure of **polymer
 electrolyte fuel cell**)

IT 9003-07-0, Polypropylene
 RL: TEM (Technical or engineered material use); USES (Uses)
 (improvements in sealing structure of **polymer
 electrolyte fuel cell**)

L49 ANSWER 11 OF 53 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN
 AN 2003-616078 [58] WPIX
 DNN N2003-490531 DNC C2003-168090
 TI Electrode for **polymer electrolyte fuel cell**
 e.g. for electric vehicle or motorized wheelchair, has solid
polymer electrolyte membrane, electrode layers
 and reinforcing members integrally formed by sealing member.

DC A85 L03 X16 X21
 IN IMAHASHI, J; KAMO, T; KOMACHIYA, M; KOYAMA, T; NISHIMURA, K
 PA (HITA) HITACHI LTD; (IMAH-I) IMAHASHI J; (KAMO-I) KAMO T; (KOMA-I)
 KOMACHIYA M; (KOYA-I) KOYAMA T; (NISH-I) NISHIMURA K
 CYC 4
 PI US 2003082429 A1 20030501 (200358)* 22p H01M004-86
 CA 2370993 A1 20030430 (200358) EN H01M004-86
 DE 10207743 A1 20030522 (200358) H01M004-86
 JP 2003142127 A 20030516 (200358) 14p H01M008-02
 ADT US 2003082429 A1 US 2002-78534 20020221; CA 2370993 A1 CA 2002-2370993
 20020207; DE 10207743 A1 DE 2002-10207743 20020222; JP 2003142127 A JP
 2001-333605 20011031

PRAI JP 2001-333605 20011031

IC ICM H01M004-86; H01M008-02

ICS H01M002-14; H01M004-96; H01M008-04; H01M008-10; H01M008-24

AB US2003082429 A UPAB: 20030910

NOVELTY - The electrode has:

(i) a solid **polymer electrolyte membrane**
(11);

(ii) electrode layers (12, 13) formed on respective faces of the membrane;

(iii) reinforcing members (14) that cover respective outer surfaces of the electrode layers; and

(iv) sealing member (15) that covers the reinforcing members.

The electrolyte membrane, electrode layers, and reinforcing members are formed by the sealing member.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:

(1) a **polymer electrolyte fuel cell**

comprising the above electrode, and an anode and a cathode side separators arranged on both sides of the electrode;

(2) a separator for the above **polymer electrolyte fuel cell**; and

(3) a generating system comprising a hydrogen gas-storing apparatus or a gas-producing apparatus that produces a hydrogen-containing gas from a hydrocarbon fuel, and the above **polymer electrolyte fuel cell**.

USE - The electrode is used in **polymer electrolyte fuel cell** (claimed) e.g. used as a power source for driving various equipment including power generating equipment, such as a stationary generating facility and a portable generator, medical care equipment, such as a motorized wheelchair or walking-aid equipment, and also for electric automobiles.

ADVANTAGE - The electrode has simplified structure, high handling property, can be transferred precisely to a predetermined position, and enables automation of a production process.

DESCRIPTION OF DRAWING(S) - The figure is a sectional view of integral electrode for the **polymer electrolyte fuel cell**.

Electrolyte membrane 11

Electrode layers 12, 13

Reinforcing members 14

Sealing member 15

Dwg.1/11

FS CPI EPI

FA AB; GI

MC CPI: A12-E06A; A12-E06B; L03-E04A2

EPI: X16-C; X16-C01C; X16-C16; X16-E06; X16-F02; X21-A01F; X21-B01A

L49 ANSWER 12 OF 53 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN

AN 2003-492250 [46] WPIX

DNN N2003-390990

TI Fuel cell **stack**, has cell units arranged symmetrically, membrane electrode assembly interposed between anode and cathode and port to

supply reactant **gases** to cell unit.

DC X16
 IN HAYASHI, K; KATO, H; OKAMOTO, H
 PA (HOND) HONDA GIKEN KOGYO KK; (HOND) HONDA MOTOR CO LTD
 CYC 4
 PI US 2003044657 A1 20030306 (200346)* 14p H01M008-06
 CA 2400452 A1 20030228 (200353) EN H01M008-24
 JP 2003068349 A 20030307 (200353) 9p H01M008-24
 DE 10239496 A1 20030918 (200369) H01M008-24
 ADT US 2003044657 A1 US 2002-232086 20020829; CA 2400452 A1 CA 2002-2400452
 20020828; JP 2003068349 A JP 2001-260399 20010829; DE 10239496 A1 DE
 2002-10239496 20020828
 PRAI JP 2001-260399 20010829
 IC ICM H01M008-06; H01M008-24
 ICS H01M008-04; H01M008-10
 AB US2003044657 A UPAB: 20030820
 NOVELTY - The cell **stack** has symmetrically arranged fuel cell
 units (12a, 12b) **stacked** together. Each cell unit has a pair of
 separators and a membrane electrode assembly interposed between the
 separators. The membrane electrode assembly has an ion exchange
membrane made of **polymer electrolyte** and is
 interposed between anode (14a) and cathode (14b). The cell units are
 electrically connected in parallel.
 DETAILED DESCRIPTION - Insulating plates (15) are **stacked**
 outside the cell unit (12b) and endplates (16a, 16b) are **stacked**
 outside the insulating plates. The cell units are fastened together to
 form cell fuel **stack**, by tightening the endplates with a tie
 rod. At the longitudinal end of endplate (16a), an oxygen-containing gas
 support (18a), a fuel gas discharge port (20b) is arranged.
 USE - Used for power generation.
 ADVANTAGE - The **supply** of reactant **gases** to the
 unit cells discharges the water, produced during the chemical reactions in
 end **stack** cell thereby resulting in efficient power generation
 in the cell system.
 DESCRIPTION OF DRAWING(S) - The drawing shows the schematic
 perspective view showing a fuel **stack** system.
 First and second fuel cell units 12a, 12b
 Anode 14a
 Cathode 14b
 Insulating plates 15
 Endplates 16a, 16b
 Oxygen-containing gas support 18a
 Gas discharge port. 20b
 Dwg.1/8
 FS EPI
 FA AB; GI
 MC EPI: X16-C01C; X16-E06A

L49 ANSWER 13 OF 53 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN
 AN 2003-769894 [73] WPIX
 DNN N2003-616809
 TI **Polymer electrolyte** fuel cell used as

portable power source includes electrolyte membrane - electrode assembly with pair of electrodes provided with predetermined tightening pressure.

DC X16 X21

IN HASE, N; HATOH, K; KANBARA, T; KOBAYASHI, S; KUSAKABE, H; OHARA, H; TAKEGUCHI, S

PA (MATU) MATSUSHITA ELECTRIC IND CO LTD; (MATU) MATSUSHITA DENKI SANGYO KK

CYC 34

PI EP 1349228 A2 20031001 (200373)* EN 36p H01M008-24
R: AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LT LU LV
MC MK NL PT RO SE SI SK TR
CA 2423545 A1 20030926 (200374) EN H01M008-24
US 2003211376 A1 20031113 (200382) H01M008-10
JP 2004006280 A 20040108 (200405) 33p H01M008-24

ADT EP 1349228 A2 EP 2003-251897 20030326; CA 2423545 A1 CA 2003-2423545
20030326; US 2003211376 A1 US 2003-397811 20030325; JP 2004006280 A JP
2003-85583 20030326

PRAI JP 2002-85277 20020326

IC ICM H01M008-10; H01M008-24
ICS G01R031-36; H01M004-94; H01M008-02; H01M008-04

AB EP 1349228 A UPAB: 20031112
NOVELTY - Each unit cell of the cell **stack** includes an electrolyte membrane - electrode assembly comprising an hydrogen ion conductive **polymer electrolyte membrane** and a pair of electrodes. A pair of electrically **conductive separator plates** with respective gas flow channels, are in contact with the electrodes. Each electrode is provided with a tightening pressure of about 2to 4 kgF/cm2
DETAILED DESCRIPTION - INDEPENDENT CLAIMs are also included for the following:
(1) A method of manufacturing a **polymer electrolyte fuel cell**; and
(2) An inspection method.
USE - For portable power source and also for electric vehicle, cogeneration system etc.
ADVANTAGE - An improved inspection mode for inspecting MEAs is introduced, making it possible to efficiently manufacture fuel cells of high performance, stable, long term power generation. Micro short -circuits and/or hydrogen leak currents between electrodes are suppressed.
DESCRIPTION OF DRAWING(S) - The figure shows a schematic front view, partial in cross section of a two cell **stacked** fuel cell.
Dwg.5/14

FS EPI

FA AB; GI

MC EPI: X16-C09; X21-A01F; X21-B04

L49 ANSWER 14 OF 53 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN

AN 2003-459602 [44] WPIX

DNN N2003-365574 DNC C2003-122402

TI **Polymer electrolyte fuel cell**, for portable power source, electric vehicle and co generation system, includes pair of end plates made of electrically insulating resin-dominant material.

DC A85 L03 X16

IN HASE, N; HATOH, K; KOBAYASHI, S; KUSAKABE, H; OHARA, H; TAKEGUCHI, S;
YAMAZAKI, T; SUGOU, M
PA (MATU) MATSUSHITA ELECTRIC IND CO LTD; (MATU) MATSUSHITA DENKI SANGYO KK;
(HASE-I) HASE N; (HATO-I) HATOH K; (KOB-I) KOBAYASHI S; (KUSA-I) KUSAKABE
H; (OHAR-I) OHARA H; (SUGO-I) SUGOU M; (TAKE-I) TAKEGUCHI S; (YAMA-I)
YAMAZAKI T

CYC 35

PI EP 1291951 A2 20030312 (200344)* EN 31p H01M008-24
R: AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR IE IT LI LT LU LV MC
MK NL PT RO SE SI SK TR

CA 2401915 A1 20030311 (200344) EN H01M008-24

CN 1405916 A 20030326 (200344) H01M008-10

JP 2003163026 A 20030606 (200346) 17p H01M008-24

KR 2003022723 A 20030317 (200350) H01M008-24

US 2003152819 A1 20030814 (200355) H01M008-10

ADT EP 1291951 A2 EP 2002-256260 20020910; CA 2401915 A1 CA 2002-2401915
20020906; CN 1405916 A CN 2002-131538 20020911; JP 2003163026 A JP
2002-264497 20020910; KR 2003022723 A KR 2002-54434 20020910; US
2003152819 A1 US 2002-238903 20020911

PRAI JP 2001-274606 20010911

IC ICM H01M008-10; H01M008-24

ICS H01M002-14; H01M008-00

AB EP 1291951 A UPAB: 20030710

NOVELTY - A **polymer electrolyte fuel cell**

comprises a **cell stack** comprising electroconductive
separator plates and electrolyte membrane-electrode
assemblies, a pair of current collecting plates and a pair of end plates
made of an electrically insulating resin-dominant material.

DETAILED DESCRIPTION - A **polymer electrolyte fuel
cell** comprises:

(a) a **cell stack** comprising electroconductive
separator plates and electrolyte membrane-electrode
assemblies respectively sandwiched between neighboring **separator
plates**, each of the electrolyte membrane-electrode assemblies
comprises a pair of electrodes with a **polymer
electrolyte membrane** sandwiched between the pair of
electrodes;

(b) a pair of current collecting plates sandwiching the **cell
stack**;

(c) a pair of end plates sandwiching the **cell stack**
provided with the pair of current collecting plates;

(d) a tightening mechanism for tightening the pair of end plates to
apply a tightening pressure to the **cell stack**; and

(e) **gas supply** and exhaust mechanism for
supplying, to the **cell stack**, and exhausting, from the **cell
stack**, an oxidant gas and a fuel **gas**, the **gas
supply** and exhaust mechanism comprising an oxidant gas inlet, an
oxidant gas outlet, a fuel gas inlet and a fuel gas outlet, and comprising
an oxidant gas flow channel for connecting the oxidant gas inlet and the
oxidant gas outlet and a fuel gas flow channel for connecting the fuel gas
inlet and the fuel gas outlet.

The pair of end plates is made from an electrically insulating

resin-dominant material comprising resin as a main ingredient.

USE - The fuel cell is used for a portable power source, an electric vehicle and a co generation system.

ADVANTAGE - Reduced cost and weight, improved utilization of thermal energy and improved corrosion resistance.

DESCRIPTION OF DRAWING(S) - The figure shows a front view of the fuel cell.

Dwg.2/16

FS CPI EPI

FA AB; GI

MC CPI: A12-E06; L03-E04A2

EPI: X16-C01C

L49 ANSWER 15 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN

AN 2003:659642 CAPLUS

DN 139:397806

ED Entered STN: 24 Aug 2003

TI Design, fabrication, and assembly of a **polymer electrolyte** membrane fuel **cell** (PEMFC)

AU Weber, Derek; Ibeh, Christopher C.

CS PSU/NSF-REU Summer 2002, USA

SO Annual Technical Conference - Society of Plastics Engineers (2003), 61st (Vol. 2), 2005-2009

CODEN: ACPED4; ISSN: 0272-5223

PB Society of Plastics Engineers

DT Journal; General Review

LA English

CC 52-0 (Electrochemical, Radiational, and Thermal Energy Technology)

AB A review. Design, fabrication, and assembly of a **Polymer Electrolyte** Membrane Fuel **Cell** (PEMFC) to maintain a low voltage source, near one volt, that runs at operating temps. near 80°, is presented. Creating a **stack** of cells will provide an energy solution that is more efficient than the system in place today. The PEMFC runs off of pure H and air (O) and will provide a power source that is nonpolluting and renewable since H is readily available through the electrolysis of H₂O. The problems with this experiment are maintaining moisture control on both the cathode and anode and the other problem is in controlling the H **gas supply** since H is very explosive when combined with O. With these problems taken into consideration the PEMFC could be the energy source for the future.

ST review design fabrication assembly **polymer electrolyte** membrane fuel **cell**

IT Fuel cells

(discussion of design, fabrication, and assembly of **polymer electrolyte** membrane fuel **cells**)

RE.CNT 10 THERE ARE 10 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE

(1) Anon; 216.51.18.233/fctypes.html

(2) Anon; www.compositestech.com P40

(3) Anon; www.fuelcellstore.com

(4) Anon; www.lynntechindustries.com

(5) Anon; www.plugpower.com

- (6) Cook, B; An Introduction to Fuel Cells and Hydrogen Technology P1
- (7) Goodman, S; Handbook of Thermoset Plastics, 2nd Edition 1998
- (8) Ibeh, C; Thermoset Resins 2001
- (9) Pyle, W; Home Power 1993, 35, P42
- (10) Ramers, D; An Undergraduate Research Experience in New Technology Commercialization of PEM Fuel Cells, Session 1436

L49 ANSWER 16 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN
 AN 2002:793989 CAPLUS
 DN 137:297442
 ED Entered STN: 18 Oct 2002
 TI **Polymer electrolyte fuel cell** and cooling system thereof
 IN Yamazaki, Tatsuto; Hase, Nobuhiro; Kusakabe, Hiroki; Ohara, Hideo; Takeguchi, Shinsuke; Yamamoto, Yoshiaki
 PA Matsushita Electric Industrial Co., Ltd., Japan; Sugou, Masayo
 SO PCT Int. Appl., 67 pp.
 CODEN: PIXXD2
 DT Patent
 LA Japanese
 IC ICM H01M008-04
 ICS H01M008-10; H01M008-24
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|---|------|----------|-----------------|----------|
| PI | WO 2002082573 | A1 | 20021017 | WO 2002-JP3315 | 20020402 |
| | W: CN, JP, KR, US | | | | |
| | RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR | | | | |
| | EP 1357624 | A1 | 20031029 | EP 2002-708775 | 20020402 |
| | R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI, CY, TR | | | | |
| | US 2003180590 | A1 | 20030925 | US 2003-392903 | 20030321 |
| PRAI | JP 2001-104107 | A | 20010403 | | |
| | JP 2001-109140 | A | 20010406 | | |
| | JP 2001-142791 | A | 20010514 | | |
| | JP 2001-179194 | A | 20010613 | | |
| | WO 2002-JP3315 | W | 20020402 | | |

AB The invention relates to a **polymer electrolyte fuel cell**. Conventionally, the output of a fuel cell may be lowered because of the difference among temps. of the cells at both ends of the fuel cell and the other cells due to heat dissipation from the end **plates**. A **polymer electrolyte fuel cell** of the invention is such that the lowering of the voltages of the cells nearest to the end **plates** is avoided without influencing the output voltages of the other cells. The **polymer electrolyte fuel cell** comprises a **cell stack** in which unit cells each composed of an anode, a cathode, and a **polymer electrolyte film** sandwiched between the anode and cathode are **stacked** with **conductive separator** sheets interposed between the unit cells, a pair of

current collector **plates** and a pair of end **plates** holding the cell **stack** and a passage for coolant for cooling the unit cells, which passage is disposed in part of the **conductive separator** sheets. At least the **conductive separator** sheet between one end **plate** and the unit cell nearest to the end plate has no coolant passage in it.

ST **polymer electrolyte fuel cell** cooling system

IT Solid state fuel **cells**

(**Polymer**; **polymer electrolyte fuel cell** cooling system)

IT Cooling apparatus

Fuel **cell** separators

(**polymer electrolyte fuel cell** cooling system)

RE.CNT 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

- (1) Fuji Electric Co Ltd; JP 08-130028 A 1996 CAPLUS
- (2) Mitsubishi Electric Corp; JP 10-340736 A 1998 CAPLUS
- (3) Sanyo Electric Co Ltd; JP 2000277132 A 2000 CAPLUS
- (4) Toshiba Corp; JP 05-159792 A 1993
- (5) Toshiba Corp; JP 07-130388 A 1995
- (6) Toshiba Corp; JP 08-7908 A 1996 CAPLUS
- (7) Toyota Motor Corp; JP 08-130025 A 1996 CAPLUS

L49 ANSWER 17 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN

AN 2002:754748 CAPLUS

ED Entered STN: 04 Oct 2002

TI High-**polymer electrolyte fuel cell**

IN Yamazaki, Tatsuto; Hase, Nobuhiro; Kusakabe, Hiroki; Ohara, Hideo; Takeguchi, Shinsuke; Yamamoto, Yoshiaki

PA Matsushita Electric Industrial Co., Ltd., Japan; Sugou, Masayo

SO PCT Int. Appl., 48 pp.

CODEN: PIXXD2

DT Patent

LA Japanese

IC ICM H01M008-02

ICS H01M008-24

FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|---|------|----------|-----------------|----------|
| PI | WO 2002078108 | A1 | 20021003 | WO 2002-JP2869 | 20020325 |
| | W: CN, JP, KR, US | | | | |
| | RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR | | | | |
| | EP 1357621 | A1 | 20031029 | EP 2002-708658 | 20020325 |
| | R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI, CY, TR | | | | |
| | US 2003157387 | A1 | 20030821 | US 2002-296513 | 20021126 |
| PRAI | JP 2001-86987 | A | 20010326 | | |
| | JP 2001-106731 | A | 20010405 | | |
| | WO 2002-JP2869 | W | 20020325 | | |

AB A fuel cell comprising a fuel **stack** including **conductive**

separator plates and an MEA (electrolyte film-electrode coupling) inserted between the **separator plates** and particularly an improvement of the **separator plate**. Conventionally, both front and rear main faces of each **separator plate** has a fuel gas circulation groove and an oxidizer gas circulation groove in the matching positions of both the gas circulation grooves. Therefore, the miniaturization of the fuel cell has caused the problem that the groove bottom between by both the gas circulation grooves of each **separator plate** needs to be thin and gas leakage by break of the thin part and difficulty in formation of the thin part may be caused. This invention makes it possible to avoid a thin part of a **separator plate** by matching the position of the gas circulation groove on one main face with that of a rib on the other main face of each **separator plate**, thereby solving the problem.

RE.CNT 8 THERE ARE 8 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE

- (1) Asahi Glass Co Ltd; JP 10255823 A 1998 CAPLUS
- (2) Asahi Glass Co Ltd; JP 11162479 A 1999 CAPLUS
- (3) Hitachi Chemical Co Ltd; JP 11354138 A 1999 CAPLUS
- (4) Honda Motor Co Ltd; JP 200021434 A 2000
- (5) Matsushita Electric Industrial Co Ltd; JP 2000133291 A 1999 CAPLUS
- (6) Matsushita Electric Industrial Co Ltd; EP 951086 A2 1999 CAPLUS
- (7) Riken Corp; JP 2000182640 A 2000 CAPLUS
- (8) Toshiba Corp; JP 11354142 A 1999 CAPLUS

L49 ANSWER 18 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN

AN 2002:696309 CAPLUS

DN 137:204022

ED Entered STN: 13 Sep 2002

TI Method of supplying reaction gas in fuel cell of solid
polymer electrolyte fuel cell assembly

IN Sugiura, Seiji; Wariishi, Yoshinori; Sugita, Narutoshi; Enjoji, Naoyuki

PA Honda Giken Kogyo Kabushiki Kaisha, Japan; Honda Motor Co., Ltd.

SO PCT Int. Appl., 108 pp.

CODEN: PIXXD2

DT Patent

LA English

IC ICM H01M008-24

ICS H01M008-02

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|---------------|--|----------|-----------------|----------|
| PI | WO 2002071526 | A2 | 20020912 | WO 2002-JP2012 | 20020305 |
| | WO 2002071526 | A3 | 20030904 | | |
| | W: | AU, BR, CA, CN, ID, IN, KR, MX, PH, PL, RU, TR, US, VN | | | |
| | RW: | AT, BE, CH, DE, ES, FI, FR, GB, IT, SE | | | |
| | JP 2002260710 | A2 | 20020913 | JP 2001-61516 | 20010306 |
| | EP 1371107 | A2 | 20031217 | EP 2002-701724 | 20020305 |
| | R: | AT, BE, CH, DE, ES, FR, GB, IT, LI, SE, SI, LT, LV, FI, RO, MK, AL | | | |
| PRAI | JP 2001-61516 | A | 20010306 | | |

WO 2002-JP2012 W 20020305

AB A cell assembly includes a first unit cell and a second unit cell which are **stacked** to each other. The first unit cell has a first unified body, and the second unit cell has a second unified body. A plurality of oxidizing gas passages and a plurality of fuel gas passages are provided in the cell assembly. The oxidizing gas passages in the first unit cell and the oxidizing gas passages in the second unit cell are communicated in series to each other. The fuel gas passages in the first unit cell and the fuel gas passages in the second unit cell are communicated in series to each other.

ST fuel cell **stack** reaction **gas supply** method

IT Fuel gases

Oxidizing agents

Solid state fuel cells

(method of supplying reaction gas in fuel **cell** of solid **polymer electrolyte** fuel **cell** assembly)

L49 ANSWER 19 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN

AN 2002:143089 CAPLUS

DN 136:170339

ED Entered STN: 22 Feb 2002

TI **Polymer electrolyte** type fuel **cell**

IN Ohara, Hideo; Kusakabe, Hiroki; Yamazaki, Tatsuto; Hase, Nobuhiro; Takeguchi, Shinsuke; Yamamoto, Yoshiaki; Matsumoto, Toshihiro; Fujii, Satoru; Hatoh, Kazuhito; Hosaka, Masato; Niikura, Junji; Nishida, Kazufumi; Kanbara, Teruhisa

PA Matsushita Electric Industrial Co., Ltd., Japan

SO PCT Int. Appl., 71 pp.

CODEN: PIXXD2

DT Patent

LA Japanese

IC ICM H01M008-02

ICS H01M008-04; H01M008-10

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|---|------|----------|-----------------|----------|
| PI | WO 2002015312 | A1 | 20020221 | WO 2001-JP6955 | 20010810 |
| | W: CN, JP, KR, US | | | | |
| | RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR | | | | |
| | EP 1246282 | A1 | 20021002 | EP 2001-955684 | 20010810 |
| | R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI, CY, TR | | | | |
| | US 2003003345 | A1 | 20030102 | US 2002-118628 | 20020409 |
| PRAI | JP 2000-247808 | A | 20000817 | | |
| | JP 2000-247809 | A | 20000817 | | |
| | JP 2000-249339 | A | 20000821 | | |
| | JP 2000-317437 | A | 20001018 | | |
| | WO 2001-JP6955 | W | 20010810 | | |

AB The invention relates to a **polymer electrolyte** type fuel **cell** comprising a hydrogen ion conductive **polymer**

electrolyte film, an anode and a cathode holding the hydrogen ion conductive **polymer electrolyte** film therebetween, an anode side **conductive separator plate** having a gas flow channel for feeding fuel gas to the anode, and a cathode side **conductive separator plate** having a gas flow channel for feeding oxidant gas to the cathode, wherein the anode side and cathode side **conductive separator plates** are rectangular with one longer side having inlet side oxidant gas manifold holes disposed therein and the other longer side having outlet side oxidant gas manifold holes disposed therein, and fuel gas manifold holes and **cooling water** manifold holes have their inlets and outlets resp. disposed on the different shorter sides so that the fuel gas manifold holes are opposed to the **cooling water** manifold holes. And the oxidant gas manifold hole, fuel gas manifold hole and **cooling water** manifold hole differ in the opening configuration from each other.

ST **polymer electrolyte** fuel cell separator

IT Polyethers, uses

RL: DEV (Device component use); USES (Uses)
(perfluoro, sulfone-containing; **polymer electrolyte**
fuel cell)

IT Fluoropolymers, uses

RL: DEV (Device component use); USES (Uses)
(polyether-, perfluoro, sulfone-containing; **polymer**
electrolyte fuel cell)

IT Fuel cell separators

Fuel cells
(**polymer electrolyte** fuel cell)

IT Carbon black, uses

RL: DEV (Device component use); USES (Uses)
(**polymer electrolyte** fuel cell)

IT Fluoropolymers, uses

RL: DEV (Device component use); USES (Uses)
(sulfone-containing; **polymer electrolyte** fuel
cell)

IT 163294-14-2, Nafion 112

RL: DEV (Device component use); USES (Uses)
(**polymer electrolyte** fuel cell)

RE.CNT 11 THERE ARE 11 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE

- (1) Aisin Seiki Co Ltd; JP 1055813 A 1998
- (2) Aisin Seiki Co Ltd; JP 2001102072 A 2001 CAPLUS
- (3) Fuji Xerox Co Ltd; JP 106513 A 1998
- (4) Honda Motor Co Ltd; CD-ROM of the specification and drawings annexed to the request of Japanese Utility Model Application No 110449/1991 (Laid-open No 66875/1993) 1993, P5
- (5) Matsushita Electric Ind Co Ltd; EP 1094535 A1 2000 CAPLUS
- (6) Matsushita Electric Ind Co Ltd; JP 200021420 A 2000
- (7) Mitsubishi Electric Corporation; JP 10223238 A 1998 CAPLUS
- (8) Seiko Epson Corporation; JP 11271701 A 1999 CAPLUS
- (9) Tanaka Kikinzoku Kogyo K K; JP 09283166 A 1997
- (10) Tanaka Kikinzoku Kogyo K K; JP 935726 A 1997

(11) Toyota Motor Corporation; JP 08138692 A 1996 CAPLUS

L49 ANSWER 20 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN
 AN 2002:889421 CAPLUS
 DN 137:355504
 ED Entered STN: 22 Nov 2002
 TI Proton electrolyte membrane fuel cell with antifreeze coolant and humidifiers
 IN Ding, Yi
 PA USA
 SO U.S. Pat. Appl. Publ., 6 pp.
 CODEN: USXXCO
 DT Patent
 LA English
 IC ICM H01M008-04
 ICS H01M008-10
 NCL 429026000
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 Section cross-reference(s): 48

FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|----------------|------|----------|-----------------|----------|
| PI | US 2002172848 | A1 | 20021121 | US 2001-861450 | 20010518 |
| | US 6632555 | B2 | 20031014 | | |
| PRAI | US 2001-861450 | | 20010518 | | |

AB The invention is an improved proton electrolyte membrane (PEM) fuel cell system suited for application in a vehicle operating in temps. below the f.p. of water. The invention eliminates the need for pure water channels within a fuel cell humidifier. Specifically, the present invention uses a closed coolant path within the fuel cell; a humidifier comprising a humidification fluid flow path and a fuel and air **gas supply** passage continuous in, through and out of the humidifier; the humidification fluid flow path and the fuel and air **gas supply** passage separated by a water permeable membrane that is impervious to organic materials allowing water from the humidification fluid flow path to enter the fuel and air **gas supply** passage; and the humidifier connected to the fuel cell by a humidified air and fuel passageway. The water permeable membrane can be a Keggin ions pillared α -ZrP composite material. In one embodiment, the coolant path can be configured to include a coolant pump and a heat exchanger. The **coolant** can be a **water** and organic material mixture (using, for example glycol) thus allowing coolant flow in temps. below the f.p.

ST proton electrolyte membrane fuel cell antifreeze coolant humidifier

IT **Polymers**, uses

RL: DEV (Device component use); USES (Uses)
 (membrane; proton **electrolyte** membrane fuel cell
 with antifreeze coolant and humidifiers)

IT Fuel cells

(power plants; proton electrolyte membrane fuel cell with antifreeze
 coolant and humidifiers)

IT Antifreeze

Coolants

Electric vehicles

Heat exchangers

Solid state fuel cells

(proton electrolyte membrane fuel cell with antifreeze coolant and humidifiers)

IT Membranes, nonbiological

(water-permeable; proton electrolyte membrane fuel cell with antifreeze coolant and humidifiers)

IT 107-21-1, Ethylene glycol, uses

RL: TEM (Technical or engineered material use); USES (Uses)

(aqueous, coolant; proton electrolyte membrane fuel cell with antifreeze coolant and humidifiers)

IT 7732-18-5, **Water**, uses

RL: TEM (Technical or engineered material use); USES (Uses)

(glycol mixed with, **coolant**; proton electrolyte membrane fuel cell with antifreeze coolant and humidifiers)

IT 13765-95-2, Zirconium phosphate

RL: DEV (Device component use); USES (Uses)

(α -, membrane; proton electrolyte membrane fuel cell with antifreeze coolant and humidifiers)

L49 ANSWER 21 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN

AN 2002:488105 CAPLUS

DN 137:49714

ED Entered STN: 28 Jun 2002

TI Modular **polymer electrolyte** membrane unit fuel
cell assembly and fuel cell **stack**

IN Foster, Ronald B.

PA USA

SO U.S. Pat. Appl. Publ., 11 pp.

CODEN: USXXCO

DT Patent

LA English

IC ICM H01M008-10

ICS H01M008-02

NCL 429030000

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|--|------------|------|-------|-----------------|-------|
| | ----- | ---- | ----- | ----- | ----- |

| | | | | | |
|----|---------------|----|----------|----------------|----------|
| PI | US 2002081474 | A1 | 20020627 | US 2000-745566 | 20001226 |
|----|---------------|----|----------|----------------|----------|

| | | | | | |
|--|------------|----|----------|--|--|
| | US 6500577 | B2 | 20021231 | | |
|--|------------|----|----------|--|--|

| | | | | | |
|------|----------------|--|----------|--|--|
| PRAI | US 2000-745566 | | 20001226 | | |
|------|----------------|--|----------|--|--|

AB Disclosed is a **polymer electrolyte** membrane fuel cell assembly apparatus for receiving an inserted membrane electrode assembly (MEA). The apparatus includes modular features for connecting a plurality of fuel cells into a planar fuel cell "**stack**" capable of using ambient air to **supply** oxidant **gas** and dissipate heat and water vapor. The invention also facilitates convenient removal and replacement of individual cells or MEAs in a **stack** without disassembly of the entire **stack**.

ST **polymer electrolyte** membrane fuel **cell**
stack module
IT Fuel **cell** electrodes
Fuel **cells**
(modular **polymer electrolyte** membrane unit fuel
cell assembly and fuel cell **stack**)
IT Rubber, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(modular **polymer electrolyte** membrane unit fuel
cell assembly and fuel cell **stack**)

L49 ANSWER 22 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN
AN 2002:886579 CAPLUS
DN 137:372559
ED Entered STN: 22 Nov 2002
TI Method for operation of **polymer-electrolyte** fuel
cell power plant
IN Kato, Shigemi
PA Fuji Electric Co., Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 4 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM H01M008-04
ICS H01M008-10
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|----------------|------|----------|-----------------|----------|
| PI | JP 2002334711 | A2 | 20021122 | JP 2001-138427 | 20010509 |
| PRAI | JP 2001-138427 | | 20010509 | | |

AB The title power plant is equipped with a plurality of fuel-cell
stacks divided for full load operation and stopped power
generation, where the process comprises supplying a fuel gas and an
oxidizing gas at constant flow to the **stacks** for full load
operation and stopping **supply** of a fuel **gas** and an
oxidizing gas to the **stacks** for stopped power generation. The
power plant is prevented from clogging of cells by water droplets.
ST **polymer electrolyte** fuel **cell** power plant
operation
IT Fuel cells
(power plants; controlled **supply** of fuel **gas** and
oxidizing gas in operation of **polymer-electrolyte**
fuel **cell** power plant)

L49 ANSWER 23 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN
AN 2002:812184 CAPLUS
DN 137:339955
ED Entered STN: 25 Oct 2002
TI Fuel cell system
IN Taniyama, Takeshi
PA Nissan Motor Co., Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 11 pp.
 CODEN: JKXXAF
 DT Patent
 LA Japanese
 IC ICM H01M008-04
 ICS H01M008-04; H01M008-10
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|----------------|------|----------|-----------------|----------|
| PI | JP 2002313379 | A2 | 20021025 | JP 2001-112613 | 20010411 |
| PRAI | JP 2001-112613 | | 20010411 | | |

AB The fuel **cell** system has a **polymer electrolyte** fuel **cell stack**, sep. pipes supplying a fuel gas and an oxidant gas to the fuel cell **stack**, humidifying means for either or both reaction **gases**, a pipe **supply** water for the humidifying means, and a means pressurizing the water supplied to the water supplying pipe; where a water tank is installed on the water supplying pipe near the inlet of the pressurizing means, the tank is connected to the fuel gas or oxidant supplying pipe, a valve is installed on the connection pipe controlling the flow of the gas to and from the tank, and a means adjusting the valve to raise the pressure in the tank when the system is operated at high load.

ST fuel cell reaction gas humidifying water pressure control

IT Fuel **cells**

Humidity

(**polymer electrolyte** fuel **cell** systems
 containing pressure adjustable water **supply** for reaction
gas humidification)

L49 ANSWER 24 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN

AN 2002:611873 CAPLUS

DN 137:143111

ED Entered STN: 16 Aug 2002

TI **Polymer electrolyte** fuel **cell** power plant
 and its operation method

IN Aoki, Makoto

PA Fuji Electric Co., Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 8 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM H01M008-04

ICS H01M008-04; H01M008-06; H01M008-10

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|---------------|------|----------|-----------------|----------|
| PI | JP 2002231283 | A2 | 20020816 | JP 2001-22922 | 20010131 |
| PRAI | JP 2001-22922 | | 20010131 | | |

AB The power plant has a **polymer electrolyte** fuel **cell stack**, means cooling the fuel cell **stack**,

means supplying a H containing fuel gas and air to the fuel cells in opposite directions, means monitoring water vapor partial pressure P_w in the cathode and anode off gases, means monitoring internal resistance of the cells, and a control system adjusting an air flow regulator, a fuel gas flow regulator, a coolant flow regulator, a coolant temperature regulator, and/or a operation c.d. regulator, when an abnormal wetting of the electrolyte membrane is detected, based on the rise of P_w in cathode off gas, the decrease of P_w in the anode off gas, and the rise of internal resistance. The power plant operation is controlled by decreasing air **supply**, increasing fuel **gas supply**, increasing coolant **supply**, lowering coolant temperature, lowering operation c.d., or increasing humidity of the fuel gas and air when an abnormal wetting of the electrolyte is monitored.

ST **polymer electrolyte fuel cell** structure
operation control

IT Fuel cells
(power plants; structure and operation control of **polymer electrolyte fuel cell** power plant)

IT Process control
(structure and operation control of **polymer electrolyte fuel cell** power plant)

L49 ANSWER 25 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN

AN 2002:364298 CAPLUS

DN 136:357484

ED Entered STN: 16 May 2002

TI **Polymer-electrolyte fuel cell** combined with
thermoelectric transducer and fuel cell **stack**

IN Shirai, Katsuya

PA Sony Corp., Japan

SO Jpn. Kokai Tokkyo Koho, 7 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM H01M008-00

ICS H01M008-10; H01M008-24

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|--|------------|------|-------|-----------------|-------|
| | ----- | ---- | ----- | ----- | ----- |

| | | | | | |
|----|---------------|----|----------|----------------|----------|
| PI | JP 2002141077 | A2 | 20020517 | JP 2000-337643 | 20001106 |
|----|---------------|----|----------|----------------|----------|

| | | | | | |
|------|----------------|--|----------|--|--|
| PRAI | JP 2000-337643 | | 20001106 | | |
|------|----------------|--|----------|--|--|

AB The title fuel cell is equipped with a proton-conducting **polymer electrolyte** membrane sandwiched with an anode and a cathode, an anode-side field plate and a cathode-side field plate having **gas** passages to **supply** an anode **gas** and a cathode gas, resp., and a thermoelec. transducer combined with one of the field plate to convert thermal energy at the cathode to elec. energy. The title **stack** is equipped with a plurality of the above fuel cells laminated through heat-insulating layers. The fuel cell provides high energy utilization.

ST **polymer electrolyte fuel cell** thermoelec

transducer combined **stack**
 IT Solid state fuel **cells**
 Thermoelectric devices
 (**stacked polymer-electrolyte fuel**
cell combined with thermoelec. transducer)

L49 ANSWER 26 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN
 AN 2002:104888 CAPLUS
 DN 136:153898
 ED Entered STN: 08 Feb 2002
 TI **Polymer-electrolyte fuel cell**
 IN Kabasawa, Akihiro; Kususe, Nobuhiko
 PA Fuji Electric Co., Ltd., Japan
 SO Jpn. Kokai Tokyo Koho, 8 pp.
 CODEN: JKXXAF
 DT Patent
 LA Japanese
 IC ICM H01M008-02
 ICS H01M008-02; H01M008-10; H01M008-24; H01M008-04
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|----------------|------|----------|-----------------|----------|
| PI | JP 2002042833 | A2 | 20020208 | JP 2000-225289 | 20000726 |
| PRAI | JP 2000-225289 | | 20000726 | | |

AB The fuel cell, equipped with a **stack** containing a **polymer electrolyte** sandwiched with (A) catalyst electrode layers and (B) diffusion electrode layers to give an anode and a cathode, comprises separators having reaction gas passages facing to A and reaction **gas** passages, **gas-supply** passages, and **gas-discharge** passages facing to B. The fuel cell provides good electrolyte humidifying property.

ST **polymer electrolyte fuel cell**
 IT Solid state fuel **cells**
 (structure of **polymer-electrolyte fuel cell**
 for humidifying **electrolyte** membrane)

L49 ANSWER 27 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN
 AN 2002:693265 CAPLUS
 DN 137:204001
 ED Entered STN: 13 Sep 2002
 TI Method of supplying reaction gas in solid **polymer electrolyte fuel cell** assembly
 IN Sugiura, Seiji; Wariishi, Yoshinori; Enjoji, Naoyuki; Sugita, Narutoshi
 PA Honda Giken Kogyo Kabushiki Kaisha, Japan
 SO Eur. Pat. Appl., 26 pp.
 CODEN: EPXXDW
 DT Patent
 LA English
 IC ICM H01M008-24
 ICS H01M008-10
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|---|------|----------|-----------------|----------|
| PI | EP 1239530 | A2 | 20020911 | EP 2002-4962 | 20020305 |
| | R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR | | | | |
| | JP 2002260689 | A2 | 20020913 | JP 2001-61527 | 20010306 |
| | US 2002146601 | A1 | 20021010 | US 2002-93235 | 20020306 |
| PRAI | JP 2001-61527 | A | 20010306 | | |
| AB | A fuel cell assembly includes a first unit cell and a second unit cell stacked to each other. The first unit cell includes a first unified body, and the second unit cell includes a second unified body. In the cell assembly, oxidizing gas passages and fuel gas passages and are provided in parallel along the first and second unit cells. | | | | |
| ST | polymer electrolyte fuel cell assembly | | | | |
| | reaction gas supply | | | | |
| IT | Solid state fuel cells (method of supplying reaction gas in solid polymer electrolyte fuel cell assembly) | | | | |

L49 ANSWER 28 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN
 AN 2002:169253 CAPLUS
 DN 136:219522
 ED Entered STN: 08 Mar 2002
 TI Impregnated carbon fiber fabrics for gas diffusion electrode of **polymer electrolyte membrane fuel cell stacks**
 IN Zuber, Ralf; Bayer, Armin; Kuehnhold, Heike; Stenke, Udo
 PA DMC2 Degussa Metals Catalysts Cerdec A.-G., Germany
 SO Eur. Pat. Appl., 13 pp.
 CODEN: EPXXDW
 DT Patent
 LA German
 IC ICM H01M008-10
 ICS H01M008-24; H01M008-02
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|---|------|----------|------------------|----------|
| PI | EP 1184925 | A2 | 20020306 | EP 2001-119314 | 20010810 |
| | R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO | | | | |
| | DE 10042744 | A1 | 20020328 | DE 2000-10042744 | 20000831 |
| | US 2002051901 | A1 | 20020502 | US 2001-933121 | 20010821 |
| | JP 2002110198 | A2 | 20020412 | JP 2001-258420 | 20010828 |
| | BR 2001003791 | A | 20020507 | BR 2001-3791 | 20010830 |
| PRAI | DE 2000-10042744 | A | 20000831 | | |
| AB | A polymer electrolyte membrane (PEM) fuel cell stack comprises ≥ 1 fuel cells with membrane electrode units, which are arranged between 2 elec. conductive bipolar plates. The bipolar plates are provided with partial-opened flow channels used for the supply of reactive gases . The membrane electrode unit | | | | |

consists of a **polymer electrolyte** membrane which is in contact to a reaction layer on both sides. A compressible, coarsely-porous gas diffusion layer consisting of **polymer**-impregnated carbon fiber fabrics is placed between each reaction layer, and bipolar plate.

- ST **fuel cell stack polymer electrolyte**
membrane; impregnated carbon fiber gas diffusion electrode; gas diffusion electrode fuel cell; **polymer** impregnated carbon fabric gas diffusion electrode
- IT Fluoropolymers, uses
RL: PEP (Physical, engineering or chemical process); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(aqueous suspension, Hostaflon TF 5235; in impregnation for carbon fiber fabrics for gas diffusion electrode of **polymer electrolyte** membrane fuel cell stacks)
- IT Carbon fibers, uses
RL: PEP (Physical, engineering or chemical process); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(fabrics, AvCarb 1071HCB; for gas diffusion electrode of **polymer electrolyte** membrane fuel cell stacks)
- IT Fuel cell electrodes
(gas diffusion; impregnated carbon fiber fabrics for gas diffusion electrode of **polymer electrolyte** membrane fuel cell stacks)
- IT Fuel cells
Polymer electrolytes
(impregnated carbon fiber fabrics for gas diffusion electrode of **polymer electrolyte** membrane fuel cell stacks)
- IT Fuel cell electrolytes
Fuel cell separators
(**polymer electrolyte** membrane; impregnated carbon fiber fabrics for gas diffusion electrode of **polymer electrolyte** membrane fuel cell stacks)
- IT 9002-84-0, PTFE
RL: PEP (Physical, engineering or chemical process); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(aqueous suspension, Hostaflon TF 5235; in impregnation for carbon fiber fabrics for gas diffusion electrode of **polymer electrolyte** membrane fuel cell stacks)

L49 ANSWER 29 OF 53 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN
AN 2002-426630 [45] WPIX
DNN N2002-335481 DNC C2002-120980
TI Supplying of hydrogen gas stream to fuel cell anode, involves introducing feed gas stream to adsorption module having chemically distinct adsorbents which adsorb contaminant to produce pure hydrogen gas stream.
DC E36 J01 J04 L03 Q14 X16

IN KEEFER, B; ROY, S; SAWADA, J; BROWN, M; JOHANNES, E; BROWN, M J; JOHANNES, E P; KEEFER, B G; SAWADA, J A
 PA (QUES-N) QUESTAIR TECHNOLOGIES INC; (BROW-I) BROWN M J; (JOHA-I) JOHANNES E P; (KEEF-I) KEEFER B G; (ROYS-I) ROY S; (SAWA-I) SAWADA J A

CYC 98

PI WO 2002035623 A2 20020502 (200245)* EN 55p H01M008-00
 RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ
 NL OA PT SD SE SL SZ TR TZ UG ZW
 W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK
 DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR
 KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PH PL PT RO
 RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG US UZ VN YU ZA ZW
 CA 2324699 A1 20020427 (200245) EN H01M008-06
 CA 2324702 A1 20020427 (200245) EN H01M008-06
 US 2002098394 A1 20020725 (200254) H01M008-04
 AU 2002014858 A 20020506 (200257) H01M008-00
 EP 1344270 A2 20030917 (200362) EN H01M008-06
 R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT
 RO SE SI TR

ADT WO 2002035623 A2 WO 2001-CA1523 20011026; CA 2324699 A1 CA 2000-2324699
 20001027; CA 2324702 A1 CA 2000-2324702 20001027; US 2002098394 A1 US
 2001-39552 20011026; AU 2002014858 A AU 2002-14858 20011026; EP 1344270 A2
 EP 2001-983346 20011026, WO 2001-CA1523 20011026

FDT AU 2002014858 A Based on WO 2002035623; EP 1344270 A2 Based on WO
 2002035623

PRAI CA 2000-2324702 20001027; CA 2000-2324699 20001027

IC ICM H01M008-00; H01M008-04; H01M008-06

ICS B60L011-18; H01M008-10; H01M008-22

AB WO 200235623 A UPAB: 20020717

NOVELTY - A feed gas stream containing hydrogen and a contaminant is introduced into adsorption module having adsorbents (A,B), steam reforming catalyst and water gas shift reaction catalyst. The adsorbents are chemically distinct, and one of the adsorbent (A or B) adsorbs contaminant in feed gas stream to produce purified gas stream of hydrogen. The purified stream is introduced to a fuel cell anode.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are included for the following:

(1) separation of carbon monoxide from gas stream containing hydrogen, involves introducing the feed stream to the rotary pressure swing adsorption module for separating portion(s) of carbon monoxide, and introducing purified gas stream to fuel cell anode;

(2) electrical current generating system which has a gas source containing hydrogen, at least one adsorption module which partially purifies the gas, and at least one fuel cell defining an anode inlet for receiving purified gas stream from the adsorption module;

(3) system for supplying hydrogen gas to fuel cell anode which has hydrogen gas generating system having outlet for discharging gas containing hydrogen and contaminants, respective contaminant separation zones, and fuel cell anodes which is attached to the outlet of contaminant (B) separation zone; and

(4) process for providing gas stream containing hydrogen and oxygen-enriched gas stream to fuel cell which involves introducing the

oxygen-enriched gas stream and purified hydrogen gas stream into fuel cell, introducing separation exhaust gas stream as fuel into combustion engine for driving devices such as compressors, vacuum pumps or electric generator.

USE - For providing gas stream containing hydrogen to fuel cell anode, used for electric power generation, particularly for vehicle propulsion and for small scale stationary power generation.

ADVANTAGE - Purification of reformat hydrogen, energy-efficient pressure swing adsorption system (PSA) oxygen enrichment, heat recovery from the fuel cell **stack** and from combustion of hydrogen PSA tail gas, and thermal powering of air compression for the oxygen PSA and of any PSA vacuum pumping are performed so as to minimize the size of the fuel cell **stack** while maximizing overall energetic efficiency of energy conversion from the raw fuel. The hydrogen **gas** delivery system **supplies** purified hydrogen **gas** to the anode gas inlet, and recirculate hydrogen gas from anode gas exit back to anode gas inlet with increased purity so as to avoid accumulation of impurities in the anode channel. Even when high hydrogen purity is specified for the PSA, a small bleed from the end of the anode channel back to the feed pressurization step of the hydrogen PSA is avoided. The accumulation of contaminant due to equipment imperfections or operational transient upsets, is eliminated.

DESCRIPTION OF DRAWING(S) - The figure shows an axial section of the rotary pressure swing adsorption systems module.

PSA module 1

Dwg.1/9

FS CPI EPI GMPI

FA AB; GI; DCN

MC CPI: E31-A03; J01-E03D; J01-E03E; J04-E01; L03-E04
EPI: X16-C15

L49 ANSWER 30 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 2

AN 2001:868867 CAPLUS

DN 136:9095

ED Entered STN: 30 Nov 2001

TI Method of controlling **polymer electrolyte fuel cell** system

IN Saito, Kazuo

PA Nissan Motor Co., Ltd., Japan

SO PCT Int. Appl., 27 pp.

CODEN: PIXXD2

DT Patent

LA English

IC ICM H01M008-04

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 48

FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|----|---------------|------|----------|-----------------|----------|
| PI | WO 2001091216 | A2 | 20011129 | WO 2001-JP3275 | 20010417 |
| | WO 2001091216 | A3 | 20020530 | | |
| | W: CN, KR, US | | | | |

RW: DE, FR, GB

JP 2001332280 A2 20011130 JP 2000-151962 20000523

EP 1287574 A2 20030305 EP 2001-919976 20010417

R: DE, FR, GB, SI, LT, LV, RO, MK, AL

US 2002106537 A1 20020808 US 2002-31368 20020118

PRAI JP 2000-151962 A 20000523

WO 2001-JP3275 W 20010417

AB In a fuel cell system and its controlling method, the fuel cell system includes a **stack** including fuel **cells** each having a **polymer electrolyte** membrane, and a controller. The controller is responsive to detected outputs of a displacement sensor and a temperature sensor and controls such that, when the **polymer electrolyte** membrane is discriminated to remain in an excessively dry state, a shut-off valve is applied with a "close" control signal to interrupt the **supply** of fuel **gas** to the **stack** and, concurrently, a shut-off valve is applied with an "open" control signal to allow air to be supplied to the **stack** while applying a pump control signal to a pump so as to maximize its rotational speed for thereby increasing the flow rate of pure water to be circulated to the humidifier from a pure water tank. Simultaneously, a timer of the controller is operated to begin counting an incremental time. As a result, air is excessively humidified by the humidifier and is supplied to the **stack** via the shut-off valve.

ST control **polymer electrolyte** fuel **cell** system

IT Control apparatus

Fuel **cells**

Process control

(method of controlling **polymer electrolyte** fuel
cell system)

L49 ANSWER 31 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN

AN 2001:579469 CAPLUS

DN 135:125063

ED Entered STN: 10 Aug 2001

TI Fuel cell power plants and their operation method

IN Aoki, Makoto

PA Fuji Electric Co., Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 6 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM H01M008-04

ICS H01M008-04; H01M008-10

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|---------------|------|----------|-----------------|----------|
| | ----- | ---- | ----- | ----- | ----- |
| PI | JP 2001216990 | A2 | 20010810 | JP 2000-27618 | 20000204 |
| PRAI | JP 2000-27618 | | 20000204 | | |

AB The power plants have an operational fuel cell **stack**, and a smaller monitoring **polymer electrolyte** fuel **cell**, supplied with the same reaction gas as for the fuel cell

stack and operated at a higher c.d. than the **stack**. The power plants are operated by cutting off reaction **gas supply** to the fuel cell **stack**, when the output of the monitoring cell drops below a 1st predetd. value, and resuming reaction **gas supply** when the output of the monitoring cell rises beyond a 2nd predetd. value higher than the 1st value.

ST fuel cell power plant operation monitoring cell

IT Fuel cells

(power plants; fuel **cell** power plants containing small **polymer electrolyte** monitoring fuel **cell** for operation control)

L49 ANSWER 32 OF 53 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN

AN 2001-168377 [17] WPIX

DNN N2001-121446

TI High temperature membrane (HTM) fuel-cell installation - uses preheating device for preheating oxidant and for pre-heating at least one process gas independently of HTM fuel-cell unit operation.

DC X16

IN BALDAUF, M; BRUECK, R; HELMOLT, R V; KONIECZNY, J; POPPINGER, M; REIZIG, M; BUCHNER, P; GROSSE, J; MATTEJAT, A; MEHLTRETTER, I; MUND, K; WAIDHAS, M; VON HELMOLT, R

PA (EMIT-N) EMITEC GES EMISSIONSTECHNOLOGIE MBH; (SIEI) SIEMENS AG

CYC 22

PI WO 2001003218 A1 20010111 (200117)* DE 20p H01M008-04

RW: AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE

W: CA CN JP US

DE 19930874 A1 20010118 (200124) H01M008-04

DE 19962683 A1 20010628 (200138) H01M008-04

ADT WO 2001003218 A1 WO 2000-DE2162 20000703; DE 19930874 A1 DE 1999-19930874 19990705; DE 19962683 A1 DE 1999-19962683 19991223

PRAI DE 1999-19962683 19991223; DE 1999-19930874 19990705

IC ICM H01M008-04

ICS H01M008-22

AB WO 200103218 A UPAB: 20010328

A HTM fuel-cell installation has at least one HTM-fuel cell unit and at least one process **gas supply**- and removal-channel, in which at least one device is provided for pre-heating the process gas before the gas enters the inlet to the reaction chamber of a HTM-fuel cell unit.

The pre-heating device specifically pre-heats the oxidant, and is operated to pre-heat at least one process gas independently of the operation of the HTM-fuel cell unit, and can thus be used to pre-heat the fuel-cell **stack** to the working temperature.

USE - **Polymer electrolyte membrane** (PEM) fuel **cell** arrangements.

ADVANTAGE - Non-humidified process gas streams along **stack** at operating temperature and/or is capable of preheating **stack** to operating temperature after rest phase.

Dwg.1/3

FS EPI

FA AB; GI

MC EPI: X16-C01C; X16-C09; X16-K

L49 ANSWER 33 OF 53 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN

AN 2001-427808 [46] WPIX

DNN N2001-317336 DNC C2001-129774

TI Solid high molecular form fuel cell, has reactive **gas supply** stream, humidifier, inert **gas supply** unit, controller and separator of unit battery circulating gas before generating electricity by controller.

DC A85 L03 X16

PA (TOKE) TOSHIBA KK

CYC 1

PI JP 2001118587 A 20010427 (200146)* 11p H01M008-02

ADT JP 2001118587 A JP 1999-293560 19991015

PRAI JP 1999-293560 19991015

IC ICM H01M008-02

ICS H01M008-04; H01M008-10; H01M008-24

AB JP2001118587 A UPAB: 20010815

NOVELTY - Fuel cell has reactive **gas supply** system (RGS) **supplies** reactive **gas** to fuel electrode and oxidizing agent electrode of membrane electrode composite, humidifiers (37a, 37b), inert **gas supply** unit (40) switchably connected to RGS, and controller (41) controlling operation of (37a, 37b) and (40). Separator of unit battery circulates gas containing water or water vapor before generating electricity by (41).

DETAILED DESCRIPTION - The fuel cell is equipped with **membrane** electrode composite comprising solid **polymer electrolyte** film, fuel electrode and oxidizing agent electrode, pinched to support, and fuel cell **stack** (18) comprising laminate of unit battery consisting of separator which **supplies** reactive **gas** to fuel electrode and oxidizing agent electrode, in electric series. The humidifier supplies saturated steam to oxidizing agent **gas supply** pipe and heating **gas supply** pipe. An INDEPENDENT CLAIM is also included for operating method of solid high molecular form fuel cell.

USE - For electricity generation system.

ADVANTAGE - The pressure loss in the separator is equalized. The shut down of the system, is prevented. Equalization of **supply** of reactive **gas**, is enabled. Stable electricity generation is performed.

DESCRIPTION OF DRAWING(S) - The figure shows the structure of solid high molecular form fuel cell. (The drawing includes non-English language text).

Solid high molecular form fuel cell **stack** 18

Humidifiers 37a, 37b

Inert **gas supply** unit 40

Controller 41

Dwg.1/8

FS CPI EPI

FA AB; GI

MC CPI: A99-A; L03-E04

EPI: X16-C01; X16-C09

L49 ANSWER 34 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN
 AN 2000:861970 CAPLUS
 DN 134:19403
 ED Entered STN: 08 Dec 2000
 TI **Polymer electrolyte fuel cells** and their
 operation method
 IN Sakai, Osamu; Gyoten, Hisaaki; Hatoh, Kazuhito; Yasumoto, Eiichi; Nishida,
 Kazufumi; Uchida, Makoto; Ohara, Hideo; Sugawara, Yasushi; Morita, Junji;
 Matsumoto, Toshihiro; Kanbara, Teruhisa
 PA Matsushita Electric Industrial Co., Ltd., Japan
 SO PCT Int. Appl., 27 pp.
 CODEN: PIXXD2
 DT Patent
 LA Japanese
 IC ICM H01M008-24
 ICS H01M008-04; H01M008-10
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|--------|---|------|----------|-----------------|----------|
| PI | WO 2000074165 | A1 | 20001207 | WO 2000-JP3275 | 20000522 |
| | W: CN, JP, KR, US | | | | |
| | RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE | | | | |
| | EP 1195831 | A1 | 20020410 | EP 2000-927842 | 20000522 |
| | R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI | | | | |
| PRAI | JP 1999-149895 | A | 19990528 | | |
| | WO 2000-JP3275 | W | 20000522 | | |
| AB | <p>The fuel cells have unit cells, containing a polymer electrolyte membrane, an electrode pair holding the membrane, and conductive separators having reaction gas passages at least on 1 side holding the electrode-electrolyte assembly, stacked with retaining plates and pressed; where the retaining plates form voids between the unit cells, and cell modules containing ≥ 1 unit cells between the retaining plates can be removed from the stack</p> <p>. During the operation of the fuel cells, the voltages of individual unit cells or cell modules are monitored, and when the monitored voltage of a cell or module falls below a predetd. level, that cell or module is replaced.</p> | | | | |
| ST | polymer electrolyte fuel cell stack | | | | |
| | structure operation | | | | |
| IT | Fuel cells | | | | |
| | (structure of polymer fuel cell stacks for replacing deteriorated unit cells or cell modules during operation) | | | | |
| RE.CNT | 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD | | | | |
| RE | | | | | |
| | (1) Fuji Electric Co Ltd; JP 6316576 A 1988 | | | | |
| | (2) Fuji Electric Co Ltd; JP 822837 A 1996 | | | | |
| | (3) Fuji Electric Co Ltd; JP 837012 A 1996 | | | | |

- (4) Fuji Electric Co Ltd; JP 10308227 A 1998 CAPLUS
- (5) Siemens Aktiengesellschaft; WO 9522179 A1 1995 CAPLUS
- (6) United Technologies Corporation; US 4198597 A 1980
- (7) United Technologies Corporation; US 4198597 A 1980

L49 ANSWER 35 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN
 AN 2000:227922 CAPLUS
 DN 132:239467
 ED Entered STN: 07 Apr 2000
 TI Fuel cell **stack** with separator of a laminate structure
 IN Matsumoto, Toshihiro; Hatoh, Kazuhito; Gyoten, Hisaaki; Kanbara, Teruhisa;
 Nishida, Kazufumi; Ohara, Hideo
 PA Matsushita Electric Industrial Co., Ltd., Japan
 SO PCT Int. Appl., 35 pp.
 CODEN: PIXXD2
 DT Patent
 LA English
 IC ICM H01M008-02
 ICS H01M008-24
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 Section cross-reference(s): 38

FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|---|------|----------|-----------------|----------|
| PI | WO 2000019555 | A1 | 20000406 | WO 1999-JP5151 | 19990920 |
| | W: CN, KR, US | | | | |
| | RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE | | | | |
| | JP 2000100457 | A2 | 20000407 | JP 1998-270861 | 19980925 |
| | EP 1116295 | A1 | 20010718 | EP 1999-943448 | 19990920 |
| | R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI | | | | |
| | US 6689504 | B1 | 20040210 | US 2001-786728 | 20010308 |
| PRAI | JP 1998-270861 | A | 19980925 | | |
| | WO 1999-JP5151 | W | 19990920 | | |
| AB | The present invention provides a fuel cell stack including a plurality of unit cells laid one upon another. Each of the unit cells includes an electrolyte, a pair of electrodes that are arranged across the electrolyte and resp. have a catalytic reaction layer, and a separator having means for feeding a supply of gaseous fuel to one of the electrodes and a supply of oxidant gas to the other of the electrodes. The separator is a laminate including a gas-tight conductive plate A and another conductive plate B having at least one slit, which continuously meanders from one end to another end of the conductive plate B. The technique of the present invention gives a compact fuel cell stack assembly by a simple process. | | | | |
| ST | fuel cell stack separator laminate structure | | | | |
| IT | Fuel cell separators (fuel cell stack with separator of laminate structure) | | | | |
| IT | Phenolic resins, uses Polyesters, uses | | | | |
| | RL: DEV (Device component use); USES (Uses) | | | | |

(fuel cell **stack** with separator of laminate structure)
 IT Fuel cells
 (polymer electrolyte; fuel cell
stack with separator of laminate structure)
 IT 7440-06-4, Platinum, uses
 RL: CAT (Catalyst use); DEV (Device component use); USES (Uses)
 (fuel cell **stack** with separator of laminate structure)
 IT 7440-44-0, Carbon, uses 11107-04-3, Sus 316 25038-59-9, Polyethylene
 terephthalate, uses 25189-22-4, ButaDiene-ethylene-propylene terpolymer
 RL: DEV (Device component use); USES (Uses)
 (fuel cell **stack** with separator of laminate structure)

RE.CNT 11 THERE ARE 11 CITED REFERENCES AVAILABLE FOR THIS RECORD
 RE

- (1) Ballard Power Systems; WO 9850973 A 1998 CAPLUS
- (2) Harry, M; US 5683828 A 1997 CAPLUS
- (3) Juelich, K; DE 19734729 C 1998
- (4) Mitsubishi Heavy Ind Ltd; JP 04267062 A 1992 CAPLUS
- (5) Mitsubishi Heavy Ind Ltd; JP 05029001 A 1993
- (6) Mitsubishi Heavy Ind Ltd; JP 05109415 A 1993
- (7) Mitsubishi Heavy Ind Ltd; JP 06333580 A 1994 CAPLUS
- (8) Mitsubishi Heavy Ind Ltd; JP 07240218 A 1995 CAPLUS
- (9) Nichols, B; US 3484298 A 1969 CAPLUS
- (10) Tanaka Kikinzoku Kogyo Kk; JP 09204924 A 1997 CAPLUS
- (11) Washington, K; US 5300370 A 1994

L49 ANSWER 36 OF 53. CAPLUS COPYRIGHT 2004 ACS on STN

AN 2000:274702 CAPLUS

DN 132:281645

ED Entered STN: 28 Apr 2000

TI Solid **polymer electrolyte** fuel cells

IN Nishihara, Hironori

PA Fuji Electric Co., Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 5 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM H01M008-24

ICS H01M008-10

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|----------------|------|----------|-----------------|----------|
| | ----- | ---- | ----- | ----- | ----- |
| PI | JP 2000123857 | A2 | 20000428 | JP 1998-291828 | 19981014 |
| PRAI | JP 1998-291828 | | 19981014 | | |

AB The fuel cells containing unit cells, having a cathode and an anode on the opposite sides of a **polymer electrolyte** membrane, **stacked** alternately with **separators**, pressing **plates** at the ends of the **stack** and tie rods fastening the plates and the **stack**, and manifolds extending the **stacking** direction to **supply** reaction **gases**; where the tie rods are inserted inside the manifolds with the part inside the manifolds coated with an insulator layer.

ST **polymer electrolyte fuel cell stack**
fastening structure

IT **Fuel cells**
(structure of fasteners for **polymer electrolyte**
fuel cells)

L49 ANSWER 37 OF 53 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN

AN 2000-256445 [22] WPIX

DNN N2000-190703 DNC C2000-078188

TI Fuel cell system includes a fuel cell **stack** comprising fuel
cells having membrane-electrode assemblies that are hydrated with liquid
water, and bipolar plates for distributing hydrogen fuel gas and water.

DC L03 X16

IN WILSON, M S

PA (REGC) UNIV CALIFORNIA

CYC 85

PI WO 2000011745 A1 20000302 (200022)* EN 28p H01M008-04

RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW NL
OA PT SD SE SL SZ UG ZW

W: AE AL AM AT AU AZ BA BB BG BR BY CA CH CN CU CZ DE DK EE ES FI GB
GE GH GM HR HU ID IL IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MD
MG MK MN MW MX NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT UA
UG UZ VN YU ZA ZW

AU 9957717 A 20000314 (200031)

US 6117577 A 20000912 (200046)

EP 1110264 A1 20010627 (200137) EN H01M008-04

R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT
RO SE SI

EP 1110264 B1 20030402 (200325) EN H01M008-04

R: AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE

DE 69906551 E 20030508 (200338) H01M008-04

ADT WO 2000011745 A1 WO 1999-US17573 19990803; AU 9957717 A AU 1999-57717

19990803; US 6117577 A US 1998-135965 19980818; EP 1110264 A1 EP

1999-945013 19990803, WO 1999-US17573 19990803; EP 1110264 B1 EP

1999-945013 19990803, WO 1999-US17573 19990803; DE 69906551 E DE

1999-606551 19990803, EP 1999-945013 19990803, WO 1999-US17573 19990803

FDT AU 9957717 A Based on WO 2000011745; EP 1110264 A1 Based on WO 2000011745;

EP 1110264 B1 Based on WO 2000011745; DE 69906551 E Based on EP 1110264,

Based on WO 2000011745

PRAI US 1998-135965 19980818

IC ICM H01M008-04

ICS H01M008-02

AB WO 2000011745 A UPAB: 20000508

NOVELTY - Ambient pressure fuel cell system includes a fuel **stack**
comprising fuel cells having membrane/electrode assemblies (MEA's) (24)
that are hydrated with liquid water, and bipolar plates (26) with anode
and cathode channels for respectively distributing hydrogen fuel gas and
water to the anode side and air with reactant oxygen to a cathode side.

DETAILED DESCRIPTION - Ambient pressure fuel cell system includes a
fuel **stack** comprising of fuel cells having membrane/electrode
assemblies (MEA's) that are hydrated with liquid water, and bipolar plates
with anode and cathode channels for respectively distributing hydrogen

fuel gas and water to the anode side and air with reactant oxygen to a cathode side. The system also includes a liquid water supply to the fuel cells for hydrating the MEA's, a hydrogen fuel **gas supply**, and near-ambient pressure blower for blowing air in excess of reaction stoichiometric amounts through the fuel cell **stack** to provide oxygen for electrochemical reaction at the cathode side.

An INDEPENDENT CLAIM is also included for a method of operating a fuel cell **stack** at ambient pressure.

USE - The system of this invention is useful as hydrogen-oxygen fuel **cells**, and more particularly, to **polymer electrolyte membrane fuel cells**.

ADVANTAGE - The system of this invention has fully hydrated membranes that overcomes the problems inherent in pressurized fuel cells using humidified reactant gases. The system of this invention uses direct liquid hydration at ambient pressure to produce a simple, low-parasitic power system and to provide direct evaporative-cooling from high volume ambient pressure air flow.

DESCRIPTION OF DRAWING(S) - Figure showing a cross-section of a unit cell defecting an ambient fuel cell system of this invention.

Flow field 12

Membrane/electrode assemblies 24

Bipolar plates 26

Dwg.1/7

FS CPI EPI

FA AB; GI

MC CPI: L03-E04

EPI: X16-C01C; X16-E06A

L49 ANSWER 38 OF 53 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN

AN 2000-163151 [15] WPIX

DNN N2000-121864 DNC C2000-051107

TI **Polymer electrolyte fuel cell** for portable

power sources, electric vehicle power sources and domestic co-generation systems has reliable unit cell **stack** fastening mechanism.

DC A85 L03 X16

IN GYOTEN, H; HATOH, K; KANBARA, T; MATSUMOTO, T; NAKAGAWA, K; NISHIDA, K; OHARA, H; SUGAWARA, Y; UCHIDA, M; YASUMOTO, E

PA (MATU) MATSUSHITA ELECTRIC IND CO LTD; (MATU) MATSUSHITA DENKI SANGYO KK
CYC 28

PI EP 981174 A2 20000223 (200015)* EN 22p H01M008-24

R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT
RO SE SI

JP 2000067887 A 20000303 (200023) 7p H01M008-02

JP 2000067902 A 20000303 (200023) 6p H01M008-24

JP 2000067903 A 20000303 (200023) 8p H01M008-24

CN 1245981 A 20000301 (200029) H01M008-10

US 6210823 B1 20010403 (200120) H01M008-02

JP 3420508 B2 20030623 (200341) 7p H01M008-24

ADT EP 981174 A2 EP 1999-116104 19990817; JP 2000067887 A JP 1998-234501

19980820; JP 2000067902 A JP 1998-233153 19980819; JP 2000067903 A JP

1998-234371 19980820; CN 1245981 A CN 1999-118054 19990819; US 6210823 B1

US 1999-374517 19990816; JP 3420508 B2 JP 1998-234501 19980820

FDT JP 3420508 B2 Previous Publ. JP 2000067887

PRAI JP 1998-234501 19980820; JP 1998-233153 19980819; JP 1998-234371
19980820

IC ICM H01M008-02; H01M008-10; H01M008-24

ICS H01M008-10

AB EP 981174 A UPAB: 20030915

NOVELTY - A device (39) restrains a first member on one end of an assembly including unit cell **stack**, first and second end **plates**, and at least one auxiliary plate (33, 34), and a second member on other end. Screw (35) is fitted in auxiliary plate such that the screw end contacts the first end plate. Compressive device compresses the unit cell **stack** when the screw is fitted in auxiliary plate threaded hole.

DETAILED DESCRIPTION - The **polymer electrolyte fuel cell** comprises:

a fuel cell **stack**, each **cell** comprising a

polymer electrolyte membrane, anode and

cathode arranged across each membrane, an anode side **conductive**

separator plate having a **gas fuel**

supply path to the anode, and a cathode side **conductive**

separator plate having oxidant **gas**

supply path to the cathode;

first end plate located on one end of the unit cell **stack**;

second end plate located on the other end of the unit cell **stack**;

an auxiliary plate located at least outside the first end plate;

at least one restraining device having band shape to restrain a first member located on one end of assembly including unit cell **stack**, first and second end **plates** and auxiliary plate and a second member on the other end to restrict separation of the first and second members;

a screw fitted in a threaded hole formed in the auxiliary plate such that the end of the screw contacts the first end plate; and

compressive device generating a repulsive force to compress the unit cell **stack** when the screw is fitted into the threaded hole of the auxiliary plate.

The auxiliary plate is made of metal having elasticity and also functions as the compressive device.

INDEPENDENT CLAIMS are given for **polymer electrolyte fuel cells**.

USE - For portable power sources, electric vehicle power sources and domestic co-generation systems.

ADVANTAGE - The fuel cell has a small sized, simply constructed unit cell **stack** fastening mechanism. Creep deformation is reduced due to long-term pressure application.

DESCRIPTION OF DRAWING(S) - The drawing shows a sectional view of the **polymer electrolyte fuel cell**.

Unit cell **stack** 30

First end plate 31

Second end plate 32

Auxiliary plate 33, 34

Screw 35

Restraining device 39

Dwg.3/13
 FS CPI EPI
 FA AB; GI
 MC CPI: A12-E06B; L03-E04
 EPI: X16-E01A1

L49 ANSWER 39 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN
 AN 1999:811493 CAPLUS
 DN 132:38135
 ED Entered STN: 24 Dec 1999
 TI **Polymer electrolyte fuel cell stacks**
 IN Hatoh, Kazuhito; Yasumoto, Eiichi; Nishida, Kazufumi; Gyoten, Hisaaki
 PA Matsushita Electric Industrial Co., Ltd., Japan
 SO PCT Int. Appl., 18 pp.
 CODEN: PIXXD2
 DT Patent
 LA Japanese
 IC ICM H01M008-24
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|---|------|----------|-----------------|----------|
| PI | WO 9966580 | A1 | 19991223 | WO 1999-JP3124 | 19990610 |
| | W: CN, US | | | | |
| | RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE | | | | |
| | JP 2000003720 | A2 | 20000107 | JP 1998-166636 | 19980615 |
| | JP 3483116 | B2 | 20040106 | | |
| | EP 1098381 | A1 | 20010509 | EP 1999-923999 | 19990610 |
| | R: DE, FR, GB, IT | | | | |
| PRAI | JP 1998-166636 | A | 19980615 | | |
| | WO 1999-JP3124 | W | 19990610 | | |
| AB | The fuel cell stacks have unit cells containing a polymer electrolyte membrane between a pair of catalytic electrodes, separators supplying fuel and oxidant gases to resp. electrodes on opposite sides of the unit cells, collector plates, insulator plates, and end plates; where the stacks have means installed between the insulator plates and collector plates or inside the end plates to remove heat and water from the off gases and to supply the supplied heat and water to fuel and oxidant gases. | | | | |
| ST | polymer electrolyte fuel cell heat water recovery | | | | |
| IT | Fuel cells (structure of polymer electrolyte fuel cell stacks containing means for heat and water recovery from off gases) | | | | |

RE.CNT 5 THERE ARE 5 CITED REFERENCES AVAILABLE FOR THIS RECORD
 RE

- (1) Fuji Electric Co Ltd; JP 06-132038 A 1994 CAPLUS
- (2) Matsushita Electric Industrial Co Ltd; EP 788172 A CAPLUS
- (3) Matsushita Electric Industrial Co Ltd; JP 09-213359 A 1997 CAPLUS
- (4) Mitsubishi Heavy Industries Ltd; JP 07-176313 A 1995
- (5) Tanaka Kikinzoku Kogyo KK; JP 09-204924 A 1997 CAPLUS

L49 ANSWER 40 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN
 AN 1999:387855 CAPLUS
 DN 131:21321
 ED Entered STN: 23 Jun 1999
 TI Solid **polymer electrolyte** fuel cell power plants
 IN Saito, Kazuo; Kogami, Taiji; Ueno, Sanji; Chizawa, Hiroshi
 PA Toshiba Corp., Japan
 SO Jpn. Kokai Tokkyo Koho, 14 pp.
 CODEN: JKXXAF
 DT Patent
 LA Japanese
 IC ICM H01M008-04
 ICS H01M008-04; H01M008-10
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|--|------|----------|-----------------|----------|
| PI | JP 11162490 | A2 | 19990618 | JP 1997-322967 | 19971125 |
| PRAI | JP 1997-322967 | | 19971125 | | |
| AB | The power plants have a fuel cell stack containing ≥ 1 unit cell , having a polymer electrolyte membrane between a cathode and an anode, a pipe supplying a fuel gas to the anode, and a pipe supplying an oxidant gas to the cathode; where a humidifying means is installed on the fuel gas and/or oxidant gas supplying pipes to supply steam or water mist to the gas. | | | | |
| ST | polymer electrolyte fuel cell power plant | | | | |
| IT | Fuel cells (power plants; solid polymer electrolyte fuel cell power plants containing reaction gas humidifying means) | | | | |

L49 ANSWER 41 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN
 AN 1999:413007 CAPLUS
 DN 131:33874
 ED Entered STN: 05 Jul 1999
 TI PEM fuel cell system with dampening and/or cooling with liquid medium, their use as well as a method for dampening and cooling of such system
 IN von Helmholtz, Rittmar
 PA Siemens A.-G., Germany
 SO Ger., 10 pp.
 CODEN: GWXXAW
 DT Patent
 LA German
 IC ICM H01M008-04
 ICS H01M008-22
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|----|-------------|------|----------|------------------|----------|
| PI | DE 19821766 | C1 | 19990624 | DE 1998-19821766 | 19980514 |
| | CA 2331664 | AA | 19991125 | CA 1999-2331664 | 19990503 |

WO 9960633 A2 19991125 WO 1999-DE1293 19990503
 WO 9960633 A3 20000106
 W: CA, JP, NO, US
 RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL,
 PT, SE

EP 1086503 A2 20010328 EP 1999-929078 19990503
 R: AT, CH, DE, DK, ES, FR, GB, IT, LI, NL, SE, FI
 JP 2002516461 T2 20020604 JP 2000-550154 19990503
 US 6576357 B1 20030610 US 2000-712396 20001114

PRAI DE 1998-19821766 A 19980514
 WO 1999-DE1293 W 19990503

AB A **polymer electrolyte fuel cell** system with
 dampening and/or cooling with liquid medium (especially for application in
 mobile

systems) has a liquid distributor in one or both axial process **gas**
supply pipelines. The liquid distributor generates directly
 droplets (with the help of a sound wave) before the gas inlet of each fuel
 cell unit of a fuel cell **stack** and combines with the process
 gas.

ST fuel cell system dampening cooling

IT Fuel **cells**

Sound and Ultrasound

(**polymer electrolyte fuel cell** system

with dampening and/or cooling with liquid medium)

RE.CNT 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

(1) Anon; EP 0743693 A1 CAPLUS

(2) Anon; DE 19641143 A1

(3) Anon; DE 4442285 C1 CAPLUS

(4) Anon; WO 9701827 A1

L49 ANSWER 42 OF 53 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN

AN 1999-250506 [21] WPIX

DNN N1999-187117 DNC C1999-073482

TI Fuel supply arrangement in solid **polymer electrolyte**
 type fuel battery - includes gas flow path equipped with water inlet
 through which water is supplied among fuel gas and oxidising agent gas
 flow paths.

DC A85 L03 X16

PA (FJIE) FUJI ELECTRIC CO LTD

CYC 1

PI JP 11073979 A 19990316 (199921)* 6p H01M008-02

ADT JP 11073979 A JP 1997-231989 19970828

PRAI JP 1997-231989 19970828

IC ICM H01M008-02

ICS H01M008-04; H01M008-10

AB JP 11073979 A UPAB: 19990603

NOVELTY - A gas flow path is equipped with main **water** inlet
 through which **cooling water** is supplied. **Water**
 is supplied among a fuel gas flow path and oxidizing agent gas flow path.

DETAILED DESCRIPTION - The battery has a fuel gas and oxidizing gas
 flow paths distributed on both the sides of membrane electrode contact

body. The contact body joins a catalyst layer to main surface of the solid **polymer electrolyte membrane** (1) forms a multi-layered cell by several laminating single cells. The single cells are formed by pinching at separators (2,2A) from the gas impermeable material. The oxidant gas containing oxygen or fuel gas containing hydrogen is supplied for generating electricity using an electrochemical reaction. The battery is maintained at predetermined temperature with **cooling water** which flows in a **cooling circuit** formed by partition of the single cell with the separator.

USE - In solid **polymers electrolyte** type fuel battery.

ADVANTAGE - The electrolyte film is maintained at a predetermined moist state by simple structure. The dimension and the weight of fuel battery multilayer body are reduced.

DESCRIPTION OF DRAWING(S) - The figure illustrates sectional drawing of the basic structure of fuel supply arrangement of the fuel battery.

(1) Electrolyte film; (2,2A) Separators.

Dwg.1/7

FS CPI EPI

FA AB; GI

MC CPI: A12-E06; L03-E04A

EPI: X16-C01C; X16-C09; X16-C15

L49 ANSWER 43 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN

AN 1998:250893 CAPLUS

DN 128:272828

ED Entered STN: 02 May 1998

TI Solid **polymer electrolyte** fuel cell power plants

IN Komaki, Hideaki

PA Zaidan Hojin Nippon Zosen Kenkyu Kyokai, Japan; Ishikawajima-Harima Heavy Industries Co., Ltd.

SO Jpn. Kokai Tokkyo Koho, 7 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM H01M008-06

ICS H01M008-06; H01M008-04; H01M008-10

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|----------------|------|----------|-----------------|----------|
| PI | JP 10106607 | A2 | 19980424 | JP 1996-279916 | 19961002 |
| PRAI | JP 1996-279916 | | 19961002 | | |

AB The power plants have **stacks** containing unit **cells**, having a **polymer electrolyte** membrane held between a cathode and an anode and reaction **gas supply** for resp.

electrodes, **stacked** alternately with separators, and a reformer supplying a fuel gas to cell anodes by reforming a raw fuel and containing a combustion chamber supplied with anode off gas from the cells; where a bypass pipe is connected to the pipe conducting the anode off gas to the burner to bypass the combustion chamber, and the amount of the anode off gas

supplied to the combustion chamber is controlled depending on the temperature in the combustion chamber, by valve installed on the pipes at the downstream side of the joining point.

ST **polymer electrolyte fuel cell** power plant

IT Fuel **cells**

(structure of solid **polymer electrolyte fuel cell** power plants)

L49 ANSWER 44 OF 53 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN

AN 1998-298268 [26] WPIX

DNN N1998-233304

TI **Polymer electrolyte membrane fuel**

cell stack. - Uses **stack** of fuel cells with membrane electrode assembly with gas distributor supplying gas to anode layer..

DC X16

IN EHRENBERG, S G; JACKSON, R J; NEUTZLER, J K; TANGREDI, T N

PA (DAIS-N) DAIS CORP

CYC 78

PI WO 9821773 A1 19980522 (199826)* EN 71p H01M008-04

RW: AT BE CH DE DK EA ES FI FR GB GH GR IE IT KE LS LU MC MW NL OA PT SD SE SZ UG ZW

W: AL AM AT AU AZ BA BB BG BR BY CA CH CN CU CZ DE DK EE ES FI GB GE GH HU ID IL IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MD MG MK MN MW MX NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT UA UG UZ VN YU ZW

AU 9871819 A 19980603 (199842) H01M008-04

ADT WO 9821773 A1 WO 1997-US20898 19971114; AU 9871819 A AU 1998-71819 19971114

FDT AU 9871819 A Based on WO 9821773

PRAI US 1996-30558P 19961114

IC ICM H01M008-04

AB WO 9821773 A UPAB: 19980701

The fuel cell **stack** comprises fuel cells (29) that are **stacked** one upon another. Each fuel cell includes a membrane electrode, with a proton exchange membrane between the cathode and anode layers. A gas distributor (43,55) engages with the membrane electrode assembly to **supply gas** to the anode layer.

The cathode side of each fuel cell may include passages for allowing oxygenated gas to pass therethrough and over the cathode layer of the particular cell. The gas distributor may comprises an enclosure that surrounds the outer edge of the anode layer of the fuel cell for a plate which faces the anode layer.

ADVANTAGE - Low cost and simple to assemble fuel cell **stack**

Dwg.4A/19

FS EPI

FA AB; GI

MC EPI: X16-C09

L49 ANSWER 45 OF 53 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN

AN 1998-102167 [10] WPIX
DNN N1998-081877
TI Fuel cell battery flow distribution evaluation method - detecting voltage characteristic across each cell during supply of anode and cathode spaces with gas flow having varying hydrogen partial pressure.
DC S02 X16
IN BUCHNER, P; GRUENE, H
PA (SIEI) SIEMENS AG
CYC 1
PI DE 19649435 C1 19980212 (199810)* H01M008-04
ADT DE 19649435 C1 DE 1996-19649435 19961128
PRAI DE 1996-19649435 19961128
IC ICM H01M008-04
ICS G01P005-14
AB DE 19649435 C UPAB: 19980309
The flow distribution evaluation method for a number of parallel anode and cathode spaces of a **polymer electrolyte membrane** fuel cell battery has the anode and cathode spaces supplied with a gas flow exhibiting a given hydrogen partial pressure, which is varied while the time characteristic of the voltage across each individual cell is measured. Pref. the anode and cathode gas spaces are supplied with a nitrogen/hydrogen mixture which has a hydrogen content which is reduced during the **measurement** of the cell **voltage**. ADVANTAGE - Simple verification of uniform flow distribution of reaction gases through series or parallel fuel cells.
Dwg.0/0
FS EPI
FA AB
MC EPI: S02-G02X; X16-C09; X16-H

L49 ANSWER 46 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN
AN 1997:617780 CAPLUS
DN 127:280785
ED Entered STN: 27 Sep 1997
TI Method for operation condition monitoring and operation control for **polymer electrolyte fuel cell stacks**
IN Ueno, Masataka; Nakajima, Hiroshi; Shiraishi, Goichi
PA Echos Research K. K., Japan
SO Jpn. Kokai Tokkyo Koho, 6 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM H01M008-04
ICS H01M008-04; H01M008-10
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|---|------|----------|-----------------|----------|
| PI | JP 09245826 | A2 | 19970919 | JP 1996-69447 | 19960229 |
| PRAI | JP 1996-69447 | | 19960229 | | |
| AB | Fuel cell operation conditions are monitored by using means for recording the voltage-time pattern of individual cells or cell groups under | | | | |

different operation conditions in memory devices, monitoring the voltage pattern, and comparing the monitored pattern with the recorded pattern. The cells are operated by adjusting the operation conditions (**supply** of water, fuel **gas**, and/or oxidant and/or cooling condition) of the cells according the the result of the comparison of the pattern.

ST fuel cell operation monitoring controlling

IT Fuel cells

(method for operation condition monitoring and operation control for **polymer electrolyte fuel cell stacks**)

L49 ANSWER 47 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN

AN 1997:473508 CAPLUS

DN 127:83892

ED Entered STN: 30 Jul 1997

TI Solid **polymer electrolyte fuel cells**

IN Matsubayashi, Takamasa; Nakaoka, Toru; Miyake, Yasuo

PA Sanyo Electric Co., Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 7 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM H01M008-04

ICS H01M008-24

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|----------------|------|----------|-----------------|----------|
| | ----- | ---- | ----- | ----- | ----- |
| PI | JP 09139222 | A2 | 19970527 | JP 1995-296414 | 19951115 |
| PRAI | JP 1995-296414 | | 19951115 | | |

AB The fuel cells have a **stack** of alternate unit **cells**, having a **polymer electrolyte** membrane between a cathode and an anode, and ribbed separators and are supplied with a mixture of water and a fuel gas in the anode side gas channels during operation; where the anode side gas channels have a water supplying and distributing manifold, a fuel gas supplying and distributing manifold, and a means for mixing water and the fuel gas. The **water** wets the electrolyte membranes, **cools** the cells, and prevents deterioration of the cells.

ST **polymer electrolyte wetting fuel cell**; fuel cell fuel **gas** water **supply**

IT Fuel **cells**

(structure of solid **polymer electrolyte fuel cells** for supplying water containing fuel gas for anodes)

L49 ANSWER 48 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN

AN 1997:377339 CAPLUS

DN 127:20982

ED Entered STN: 16 Jun 1997

TI **Stacked fuel cell with solid polymer electrolyte**

IN Kabasawa, Akihiro
 PA Fuji Electric Co., Ltd., Japan
 SO Jpn. Kokai Tokkyo Koho, 6 pp.
 CODEN: JKXXAF
 DT Patent
 LA Japanese
 IC ICM H01M008-02
 ICS H01M008-04
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|----------------|------|----------|-----------------|----------|
| PI | JP 09092309 | A2 | 19970404 | JP 1995-244088 | 19950922 |
| PRAI | JP 1995-244088 | | 19950922 | | |

AB Each unit cell in a **stack** of fuel cells with a **polymer electrolyte** is provided with a humidifying unit installed close to the cell. Gas which is passed through the porous substrate and water-permeable film to separator is humidified. The **supply** of humidified gas provides for stable operation even without stationary humidifiers.

ST humidification gas fuel cell solid electrolyte

IT Air conditioning
 (humidification; **stacked** fuel cell with solid **polymer electrolyte**)

IT Fuel cells
 (**stacked** fuel cell with solid **polymer electrolyte**)

L49 ANSWER 49 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN

AN 1997:116433 CAPLUS

DN 126:133526

ED Entered STN: 20 Feb 1997

TI Solid **polymer electrolyte** fuel cell

stacks with built-in cathode gas humidifying means

IN Nakajima, Riichi; Hamada, Akira; Matsubayashi, Takamasa; Myake, Yasuo

PA Sanyo Denki Kk, Japan

SO Jpn. Kokai Tokkyo Koho, 6 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM H01M008-04

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|----------------|------|----------|-----------------|----------|
| PI | JP 08321317 | A2 | 19961203 | JP 1995-126582 | 19950525 |
| | JP 3219639 | B2 | 20011015 | | |
| PRAI | JP 1995-126582 | | 19950525 | | |

AB The fuel cell **stacks** have a water recovering means in the air outlet header, for recovering water from cathode off gas by heat exchange, and a porous material having 1 end near the water recovering means, to receive the recovered water, and the other end crossing inside the air

inlet header. A H absorbing alloy tank for supplying H as fuel gas for the cell anodes may be used for the heat exchange for water recovery.

ST solid **polymer electrolyte** fuel cell
humidifying; fuel cell air humidifying water recovering

IT Alloys, uses
RL: DEV (Device component use); USES (Uses)
(hydrogen absorbing; fuel cell **stacks** containing hydrogen absorbing alloys for fuel **gas supply** and for recovering water from cathode off gas for humidifying air for cathodes)

IT Fuel **cells**
(solid **polymer electrolyte** fuel cell **stacks** containing means for recovering water from cathode off gas for humidifying air for cathodes)

L49 ANSWER 50 OF 53 CAPLUS COPYRIGHT 2004 ACS on STN
AN 1992:63503 CAPLUS
DN 116:63503
ED Entered STN: 21 Feb 1992
TI Solid **polymeric** electrolyte fuel-cell power plants and their operation
IN Furuya, Choichi; Ichikawa, Kuninobu; Wada, Ko; Imai, Tetsuya; Takeuchi, Yoshiyuki; Yanagi, Masaaki
PA Mitsubishi Heavy Industries, Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 5 pp.
CODEN: JKXXAF

DT Patent
LA Japanese
IC ICM H01M008-06
ICS H01M008-04; H01M008-10
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------|----------------|------|----------|-----------------|----------|
| PI | JP 03203165 | A2 | 19910904 | JP 1989-338731 | 19891228 |
| | JP 2761066 | B2 | 19980604 | | |
| PRAI | JP 1989-338731 | | 19891228 | | |

AB The power plants have MeOH-steam reformers, CO-removing devices, and humidity-regulating devices connected in sequence to fuel cells comprising a **polymeric** electrolyte membrane held between a pair of **gas**-diffusion electrodes to **supply** H for the cells, where the humidity-regulating device has a hydrophobic gas-diffusion membrane, and the gas exited from the CO-removing devices is made in contact with **cooling water** from the cells via the membrane. The CO-removing devices can be chemical or electrochem. oxidizing devices. The operation of the power plants includes steps of decreasing CO content in the H-rich reformed gas to <10 ppm, saturating the humidity of the CO-removed gas with the **cooling water**, and controlling the operation temperature of the fuel cells at 50-100°.

ST **polymer electrolyte** fuel cell power plant;
carbon monoxide removal fuel cell; humidity control hydrogen fuel cell

IT Humidity
(saturation with, of hydrogen-rich reforming gas, for solid **polymer**

-electrolyte fuel cells)
IT Fuel cells
(solid-state, power plant, with **polymer electrolytes**
, structure and operation of)
IT 1333-74-0, Hydrogen, uses
RL: USES (Uses)
(carbon monoxide removal from and humidity saturation of, for solid
polymer-electrolyte fuel cells)
IT 630-08-0, Carbon monoxide, miscellaneous
RL: REM (Removal or disposal); PROC (Process)
(removal of, from hydrogen-rich reforming gas, for solid
polymer-electrolyte fuel cells)

L49 ANSWER 51 OF 53 JAPIO (C) 2004 JPO on STN
AN 2003-257469 JAPIO
TI PEM FUEL CELL **STACK** AND ITS MANUFACTURING METHOD
IN ZUBER RALF DR; BAYER ARMIN; KUEHNHOLD HEIKE; DZALLAS HOLGER; DAURER MARC
PA OMG AG & CO KG
PI JP 2003257469 A 20030912 Heisei
AI JP 2003-54744 (JP2003054744 Heisei) 20030228
PRAI EP 2002-4599 20020228
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 2003
IC ICM H01M008-24
ICS H01M008-00; H01M008-10
AB PROBLEM TO BE SOLVED: To provide a fuel cell **stack** having a
simplified design and good electrical performance.
SOLUTION: Each fuel cell includes a membrane electrode assembly 2 and
conductive bipolar states 3, 4 and the **membrane** electrode
assembly includes a **polymer electrolyte**
membrane 5. The **polymer electrolyte**
membrane has contact with reaction layers 6, 7 at the side faces.
The reaction layers cover a region smaller than the **polymer**
electrolyte membrane, and compressive **gas**
supply layers 8, 9 of carbon fiber materials are provided between
each of the reaction layers and each of bipolar plates adjacent thereto
(substantially combined with the reaction layers). Gaskets 11, 12 are
located outside the region covered with the **gas supply**
layers. The PEM fuel cell **stack** has a gas diffusion electrode
compressed to be thinner, 50-85% of an original thickness.
COPYRIGHT: (C)2003,JPO

L49 ANSWER 52 OF 53 JAPIO (C) 2004 JPO on STN
AN 2002-110198 JAPIO
TI **POLYMER-ELECTROLYTE FUEL CELL STACK**
AND ELECTRIC VEHICLE WITH THIS FUEL CELL **STACK**
IN ZUBER RALF DR; BAYER ARMIN; KUEHNHOLD HEIKE; STENKE UDO DR
PA DMC 2 DEGUSSA METALS CATALYSTS CERDEC AG
PI JP 2002110198 A 20020412 Heisei
AI JP 2001-258420 (JP2001258420 Heisei) 20010828
PRAI DE 2000-10042744 20000831
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 2002
IC ICM H01M008-02

ICS H01M004-86; H01M008-00; H01M008-10

AB PROBLEM TO BE SOLVED: To provide a fuel cell **stack** having simple composition compared with a prior art which is equivalent or improved in electrical output.

SOLUTION: A PEM fuel cell **stack** comprises one or more fuel cell(s) 1, which is (or are) arranged above and below, having membrane-electrode units (2) between two electrically conductive bipolar electrode plates (3 and 4) having passages (10) whose one sides are opened to **supply** a reactive **gas** on their surfaces. In this case, each membrane-electrode unit has a **polymer electrolyte-membrane** (5) which comes into contact with reaction layers (6 and 7) on its surface, the reactive layers have their surface areas which are smaller than that of the **polymer electrolyte-membrane**. Gas-distributing layers (8 and 9) comprising carbon fiber-made cloth, which can be compressed and have rough pores, are provided between each reaction layer and the bipolar electrode plate adjacent to the reaction layers. Packing (11 and 12) is inserted in an area except the surface covered with the gas-distributing layers (8 and 9), and the gas-distributing layers have a thickness of D1 and the packing has a thickness of D2.
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L49 ANSWER 53 OF 53 JAPIO (C) 2004 JPO on STN

AN 2000-123853 JAPIO

TI FUEL CELL SYSTEM

IN KURITA KENJI

PA AISIN SEIKI CO LTD

PI JP 2000123853 A 20000428 Heisei

AI JP 1998-296672 (JP10296672 Heisei) 19981019

PRAI JP 1998-296672 19981019

SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 2000

IC ICM H01M008-04

AB PROBLEM TO BE SOLVED: To eliminate differential pressure between fuel gas and oxidizing agent gas within a fuel cell **stack** in stationary operation, and prevent the breakage of a solid **polymer electrolyte membrane**.

SOLUTION: An opening adjusting means V1 for adjusting an oxidizing agent gas pressure is installed in an oxidizing agent gas pipe line connecting an oxidizing agent **gas supply** means 43 and an oxidizing agent **gas supply** opening of a fuel cell **stack** 2, an opening adjusting means V2 for adjusting fuel gas pressure is installed in a fuel gas pipe line connecting a fuel **gas supply** means and a fuel **gas supply** opening of the fuel cell **stack** 2, and a combustion means 3 for burning unutilized fuel gas and unutilized oxidizing agent gas both exhausted from the fuel cell **stack** 2 is installed to constitute a fuel cell system.

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